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The Farmer's Digest

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The Farmer's Digest

Volume 4 September, 1940 Number 5

We Milk Cows Before They Freshen

Condensed from Eastern States Cooperator

C. L. Clevenger

Livestock Superintendent at Mt. Hope Farm, the estate of E. Parmalee Prentice in Williamstown, Massachusetts

SEVERAL years ago, we had the pleasure of a visit from Professor Boutflour, of the Royal Agricultural College, Cirencester, England. Professor Boutflour is probably best known in America as the person who worked out the ration "Cherry" —the grade milking Shorthorn— ate while making her record of more than 41,000 pounds of milk.

Shortly after his arrival and while looking over our herd, we came to a stall where one of the men was attempting to milk a heifer that had recently freshened with her first calf. As most of you know from personal experience, he had his hands full, with the badly caked udder and swollen teats. Professor Boutflour remarked that the training should have been taken care of three weeks before and the swelling prevented entirely. He told us how they had learned to avoid the udder and feeding problems we associate with calving time by milking the cows and heifers before freshening.

This sounded quite revolutionary to us, but we noted his comments and instructions carefully and tried out the method on a few animals. The results were encouraging, but so out of the ordinary that we did not make it a regular practice until about 18 months ago. About that time we had more than our share of caked udders and animals off feed at calving time and decided to give the system a real trial. Since that date we have milked approximately 50 animals previous to freshening and during this period we have experienced no unfavorable results. Now we are convinced the method has much merit, particularly with high producing animals.

One of the benefits is the elimi-

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nation of milk fever, probably brought about by the gradual increase in production as contrasted to the great increase, with the resulting shock to the entire system of the animal, that occurs just after calving when the udder has not been relieved.

The next in importance is the elimination, to a large degree, of caked udders and the attendant dangers. This is a decided advantage with heifers and makes it a great deal easier to train them to milk. With mature animals, it prevents breaking down of the udder and should go a long way in preventing pendulous udders on the older animals.

The milk is fit for use after the first few milkings, except for a few days right at calving. The milker will have to use his judgment about discarding that showing colostrum. We have had no difficulty with our calves as the milk apparently has colostrum properties to a sufficient degree to insure the health of the calf. I have been told that it is possible to freeze the milk obtained at the first milkings and use it for the calf. This may be a good practice and is one that could be put into effect if difficulties were encountered.

Some cows require milking much earlier than others regardless of age. We milk them when they need it, and at no time do we permit the udder to reach the caked, feverish condition we had to contend with so frequently in the past. Some are milked three weeks before calving and others during only a few days prior to freshening. If they do not make up an udder by a week before the date due, we start in, frequently getting a pound or less for the first milking. The amount will increase rapidly and we have had many animals give 30 to 40 pounds a day previous to calving.

By eliminating the caked udders another great advantage is found in that the cows are ready to go to work and start off at a higher rate of production than previously. They can and will take more feed and in this respect our results have been highly satisfactory.

In following this practice of pre-milking, one must bear in mind that the udder is very susceptible at freshening time and strict sanitation must be followed. We make a practice of applying a small quantity of clean vaseline to the end of each teat after each milking. This acts as an antiseptic and also prevents drops of milk from adhering to the end of the teats where all infection starts.

Pork by Postel

Condensed from Successful Farming

C. H. Burgess

THE pork produced by Philip H. Postel on his Southside Stock Farms, Green County, Illinois, has been in the national limelight for several years—and here's the reason:

Until recently, Postel raised mostly Hampshires. With them he made a singular record, having topped the East Saint Louis market with virtually all of 5,000 head for a five-year period. But Postel was not satisfied merely with top prices. Cost of producing hogs was a greater factor in determining profits than the prices at which the hogs sold, he reasoned. He was already following all the commandments of swine-management. How could he produce hogs cheaper? Why not try crossbreeding?

Postel had been producing Hampshires that conformed rigidly to breed standards, but believed that breed standards and packer standards did not jibe. As the ultimate end of hogs is on the market, he decided to see if a Berkshire-Hampshire cross would come nearer to the ideal market hog.

"We selected purebred Hampshire sows," explained Postel, "because they are good mothers, good rustlers, and save more pigs. Pig-eating is virtually unknown and lying on pigs is minimized." Purebred Berkshire boars were used because "they have a lot of ham, are good feed-lot hogs, and dress well."

The Berkshire-Hampshire cross is the perfect market type, Postel thinks. These hogs have big hams, broad loins; the legginess of the Hampshire is absent; the snout is of medium length; and the body is not too long. "This type of market hog conforms closely to packer standards," said Postel, "and is in contrast to the old type which had too much arch in the back, was too long, too tall. The old type was more of a lard hog."

Postel found his crossbreds proved other theories of crossbreeding enthusiasts: They grew faster, thus making more efficient use of feed. (It is not unusual for the Postel porkers to reach 250 pounds at six months.) Dressing percentage was excellent, being approximately 83 percent at the usual marketing weights of 220 to 240 pounds. The crosses were cheaper to produce than straight breeds, and buyers backed them up by paying top prices.

Postel's spring pig crop comes in late January and February be-

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cause "early pigs can be produced somewhat cheaper than late pigs, and, as farm work isn't so pressing, they can be given attention when they need it most. This practice enables us to market hogs in the late summer when prices are usually at their best. If we marketed them later we would encounter lower prices and lose the benefit of early farrowing." The fall pig crop comes in mid-August to September.

Marketing at the proper time is important, but more so is swine-management. Feed, for instance, is responsible for approximately 85 percent of the cost of fattening pigs. Postel sows are fed ground oats, some yellow corn, wheat middlings, alfalfa meal, and a commercial supplement during gestation. If the weather is bad, sows farrow in heated brooder houses, each partitioned to hold six head.

At 10 to 14 days, pigs and sow are put in an A-house on clean ground, generally bluegrass or alfalfa pasture, sometimes sweet clover. On pasture, pigs get shelled corn, wheat middlings, and a commercial feed from a self-feeder. Each A-house and its occupants constitute a community, separated from the rest by movable gates, which are removed after the pigs get older.

Sows do their own weaning. At 100 pounds, pigs get corn, alfalfa meal, wheat, mineral, and a commercial supplement in dry lot. Some follow the cattle.

By following selective breeding, Postel is attempting to raise Hampshires to conform to packer requirements. Evidently, other Hampshire-breeders think such a move is advisable. In May, 1939, the Hampshire Swine Record Association, packer representatives, and extension authorities held a three-day conference at Southside Stock Farms and near-by Cook Valley Farms to determine the standard type of hog that would suit everybody. Some of the changes suggested had already been inaugurated by Postel in his crossbreeding program.

Postel has had singular success in the show ring with his Berkshire-Hampshire cross. The natural tendency for exhibitors would be to mark the best animals for show early and give them special attention. Postel porkers are fed as if for market; none are pampered. A few days before exhibition the best ones are picked out and prepared for the ring.

Postel's method of crossbreeding, swine-management, and selection for the ring bears fruit. In 1936 his Berkshire-Hampshire crossbreds won the grand championship carlot at the International—the first time Postel showed there. He repeated with similar hogs in 1937, 1938, for a consecutive record that has never been equaled.

Yellow Rocket is On the March

Condensed from American Agriculturist

AN enemy is on the march on our eastern farms—winter cress, commonly known as yellow rocket. Many farmers are calling it mustard, but while it is a member of the mustard family, *yellow rocket is not mustard, and in fact is harder to control and more damaging.* Mustard can be and is being controlled, but yellow rocket is spreading fast and this year alone will take a toll of hundreds of thousands of dollars out of the pockets of northeastern farmers.

If you think I am an alarmist, or if you don't believe that rocket is a dangerous pest, travel almost anywhere in the farm country in spring and notice the thousands of fields infested with it, some of them just a solid mass of yellow, leaving little or no chance for grain or hay to grow. It is worse in new seedings, but you can see it in pastures, meadows, or anywhere. In recent travels I have seen many farmers in the fields pulling rocket by hand, and in some cases at least this looked to be a hopeless task, like trying to push back the sea with a broom.

This weed is what is known as a winter annual, that is, it commonly germinates in the fall and appears then as rosettes of waxy leaves. It comes on early in the spring. It can also germinate in the spring, and sometimes it is even a short-lived perennial, living for two or three years.

Like all bad weeds, rocket seed is very viable (full of life). That is one reason why it persists under all kinds of conditions, and why it is hard to control.

Another reason why rocket spreads so rapidly is the vast number of seeds which one plant can germinate. A single mustard plant—and rocket belongs to the mustard family—has been found to produce more than 500,000 seeds in one season! So viable is rocket seed that it can remain dormant for many years in an unfavorable soil and then suddenly spring to life. That is what happened this year. The dry weather of recent years prevented it from germinating, but this spring it has yellowed vast acreages because there is so much moisture.

Before any program of control for rocket can be decided upon, it is first necessary to know how this pest is spread. Here are some of the ways that rocket travels on to new farms and new meadows:

1. *Through grass seed mixtures. Poorly cleaned alsike and timothy seed, and so-called "bargain*

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mixtures," are the worst carriers of rocket seed. A farmer cannot buy such seed and then hope to clean it for himself, for a fanning mill cannot get it. There is very little rocket seed in good grades of seed.

2. Rocket seed is spread in farm manure from livestock fed with hay which contains the seed.

3. Rocket travels along the fences from farm to farm and from meadow to meadow, and is frequently carried from farm to farm by way of ditches.

4. Rocket is spread by buying hay from other farms which are infested.

How to Control Rocket

Prevention is, of course, more important than trying to handle rocket after a bad infestation. No farmer who has had experience with this bad weed needs to be told that control is a hard job. There is no one cure-all, no one method that will entirely prevent the spread of this weed. Complete eradication after a bad infestation probably is too much to expect, but control it you must if you are going to continue to produce crops. Here are some of the prevention and control methods:

1. Buy clean, high-quality seed. Avoid poorly cleaned, locally grown alsike and timothy seed.

2. Badly infested fields may be disked or harrowed several times in late summer or early fall to destroy rosettes and to induce the seeds to germinate. Plow under next spring and follow with a cultivated crop. *Clean cultivation in a short rotation is in fact probably the best means of control not only for rocket but for most other weeds.*

3. Where the infestation of rocket is just started, pull or chop out every plant, take them off the field and burn them. That's a lot of work, but it may save you hundreds of dollars in years to come. Rocket seed matures even after immature plants are cut, hence the need of removal.

4. Don't sweep out the haymow and throw the chaff on the meadow.

5. The farmer who has no rocket should avoid buying any hay, if at all possible.

6. Keep ditches clean, and try to get your neighbors to do the same.

7. Cut hay as early as possible, and if there are spots where there is a bad infestation, such as swales or water runs, cut that hay separately and burn it.

8. Make grass silage, particularly of the hay which has yellow rocket in it. The heat, and especially the acid, of the silage kill the rocket seed, and by cutting the hay early for ensilage you get the rocket off before it seeds back on the land. *Where grass silage can be made, it is one of the best rocket control methods.*

9. In new meadows it has been suggested that you mow the tops of yellow rocket as soon as the flowers appear, and low enough to catch the lowest flower stalks. This method may not be practical in every case, and there is danger of injury to your grass stand.

10. Spraying will control mustard, but is not safe to use on rocket, because a spray mixture strong enough to kill the rocket may also kill the crop.

Cooperative Campaign

Here is a problem that cannot be entirely solved in any community by individual farmers working alone. If one man cleans up and his neighbors fail to do so, he will be right back with them in a year or so. I suggest therefore, the following cooperative campaign:

1. Talk this problem over with your county agent. Get him to call a meeting in your neighborhood to discuss the problem of rocket and agree upon a united program of control.

2. It is suggested to all Grange lecturers and to those in charge of other local farm meetings where there is rocket in the neighborhood, either a bad infestation or where it is just starting, that an entire meeting be devoted to working out a program for the control of this weed.

3. I suggest also that teachers of agriculture in all sections where there is rocket emphasize this problem with their students, and the need of a united cooperative program to control it.

4. It is further suggested that seedsmen cooperate to make sure that their grass seed is free from rocket seed.

Safe Lamb Feeding

Condensed from Capper's Farmer

L. G. Ellis

FOR 36 years Joseph D. Sturgis has fed northwestern and southwestern lambs annually. Death losses don't average more than 3 per cent and shirt losses haven't happened. That adds up to a formula. Here it is as practiced on the 400 acres in St. Joseph county, Michigan.

1—He buys white face, close wool lambs of the Rambouillet type. Order to the commission man reads: "Ship us a double deck load of choice, close wool, heavy bone, stretchy type white face lambs. Fill as specified or they will be your lambs on arrival here."

"We've never had to turn down but two loads," said Mr. Sturgis. "Our weight preference is 60 pounds into the lots, October 1. Sometimes we buy as late as December with the expectation of shearing. Other times we specify Texans to avoid excessive beginning weight.

2—The number ranges from 700 to 1,200 and never has exceeded 1,800. Variation is occasioned by amount of home-produced feed available. Primary effort is to make lamb feeding safe and to avoid speculation to the extent possible. But he always feeds, "because nobody can guess the right time to be out and the right time to be in the business," he explained. "It's like raising potatoes. A man must look for his justification for production in the average over a period of years rather than in a single crop or feeding venture. Further, I must maintain the fertility of my soil and lamb feeding affords profitable utilization of crops grown for that purpose."

3—Upon arrival, lambs are trucked home. If driven they'll pick up too much washy grass on the way and that will cause trouble among lambs that have been on dry range.

4—Bunks, racks, and water are under cover because inside feeding has proved advantageous in that climate.

5—Cover water tanks so lambs can't drink until they have a fill of dry roughage. Red clover is preferred, but first cutting alfalfa may be substituted, especially if it was wet and bleached in the field. Bright wheat straw also is made available. Avoid second cutting alfalfa at the start. Later it may be fed if the change-over is made gradually.

"Our experience indicates corn

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fodder or shocked corn is dangerous," Mr. Sturgis explained. "Death losses have been much lighter since we quit using it. A neighbor over in Indiana lost 28 before he discontinued fodder and none afterward. Another had a similar experience altho his loss was only 18."

6—Uncover tanks after the lambs have filled on hay. Mr. Sturgis believes a double handful of hydrated lime to a barrel of water aids in preventing digestive disturbances.

7—Salt induces drinking and must be fed carefully. Don't offer it for a week and then only in limited amount—a little sprinkled on bunk floors before feeding. After they have become accustomed to it, a more liberal supply can be made available.

8—Feed no grain for a week. For 330 lambs allow not more than 2 pecks of oats and a peck of shelled corn the first feed. Mr. Sturgis also adds winter wheat bran, a little at the start, works up to a bushel but never feeds to exceed 2 sacks a week to a double deck load.

Many of the lambs, not accustomed to grain, will not come up at first and one important reason for limiting the early allowance is to prevent the more greedy ones from eating too much. After 2 or 3 feeds the timid ones will begin to nibble. Thereafter, feed twice a day, but watch reactions carefully.

9—"Scours is the big danger and all these precautions are directed at preventing it," said Mr. Sturgis.

10—"To avoid worm losses we treat, but after two weeks, never on arrival."

11—Continue the oats feeding but reduce amount in favor of corn until at the end of 30 days the proportions are half and half. Oats should be continued at least 60 days, and Mr. Sturgis rarely eliminates them entirely from the ration.

12—Five weeks after lambs are started on feed, pea size soybean meal, 10 per cent of the total ration by weight, is added. The amount is gradually increased to 20 per cent. In the absence of soybean meal, substitute oil meal.

13—Feed for a 30 pound gain. That will require 120 to 140 days. By January 20 lambs that were larger in the beginning will be prime. He goes through the sheds and picks out those which have done best, perhaps a single deck, and sends them to market at around 98 pounds. The next deck will not average so heavy but will be ready February 15. Tail enders will go March 1.

Reinforced Manure More Valuable

Condensed from New Jersey Farm and Garden

A. W. Blair

INFORMATION is frequently sought as to ways of reinforcing manure to make it more valuable from the fertilizer standpoint.

It may be pointed out that a ton of average mixed farm manure, in the moist condition, will contain about ten pounds of nitrogen, six pounds of phosphoric acid and ten pounds of potash. It is thus apparent that it is important to increase the phosphoric acid content of manure. It is well also to increase to some extent the amount of available nitrogen and potash, especially if it is to be used in place of commercial fertilizer. A suitable mixture could be made as in Table 1.

In plant food content this would approximate 800 pounds of a 4-8-7 fertilizer, which would be suitable for a variety of crops.

Van Slyke gives the average analysis of mixed hen manure containing 55 per cent water as: nitrogen, 1 per cent; phosphoric acid, 0.8 per cent, and potash, 0.4 per cent. Using this as a base, a mixture could be made as shown in Table 2.

One ton of this mixture would be approximately equivalent, in plant food content, to 800 pounds of a 4-9-7 fertilizer.

In 1932, samples of air-dried poultry manure from the Poultry Department of the Experiment Station analyzed as follows: ni-

Table No. 1

	Containing		
	N	P_2O_5	K_2O
	lbs.	lbs.	lbs.
1400 lbs. avg. farm manure	7.0	4.2	7.0
400 lbs. 16% superphosphate		64.0	
100 lbs. sulfate of ammonia	20.5		
100 lbs. 50% muriate of potash			50.0
2000 lbs.	27.5	68.2	57.0

Table No. 2

	Containing		
	N	P_2O_5	K_2O
	lbs.	lbs.	lbs.
1500 lbs. hen manure	15.0	12.0	6.0
300 lbs. 20% superphosphate		60.0	
100 lbs. sulfate of ammonia	20.5		
100 lbs. 50% muriate of potash			50.0
2000 lbs.	35.5	72.0	56.0

Reprinted by permission from N. J. Farm and Garden, Sea Isle City, New Jersey, July, 1940

trogen, 3.2 per cent; phosphoric acid, 3.2 per cent, and potash, 2.0 per cent. Using manure of this analysis as a base, a suitable mixture could be made as in Table 3.

Table No. 3

	Containing		
	N lbs.	P_2O_5 lbs.	K_2O lbs.
1600 lbs. dried poultry manure	51.2	51.2	32.0
300 lbs. 16% superphosphate		48.0	
50 lbs. sulfate of ammonia	10.3		
50 lbs. 50% muriate of potash			25.0
2000 lbs.	61.5	99.2	57.0

One ton of this mixture would approximate in plant food content 1,000 pounds of a 5-10-5 fertilizer, which would be suitable for a variety of vegetable and other crops.

It is frequently advisable to use superphosphate on the dropping boards in poultry houses. This reinforces the manure at its weakest point—phosphoric acid—and likewise aids in retaining ammonia which might otherwise be lost. The ammonia in the manure, which is more or less volatile and thus easily lost, unites with the gypsum of the superphosphate to form a stable compound, ammonium sulfate.

It is not advisable to use lime with manure. This reacts with compounds in the manure in a way that causes the loss of ammonia.

Manure in piles should not be exposed to leaching rains, which would naturally cause a great loss of soluble constituents, but on the other hand should be kept moderately moist to prevent loss of ammonia and destruction of organic matter through undue heating. Unless manure can be kept moist and well packed, without exposure to heavy rains, it is best, where possible, to spread on the fields as produced.

Manure is also reinforced and saved by the proper use of bedding. The liquid portion of the manure is the most valuable, and the greater the absorbing properties of the bedding the greater its value in this respect. There are a number of materials which may be used for bedding, as for example, the different straws, salt marsh hay, peanut shells, wood shavings, sawdust, and peat moss. Of these, peat moss has the greatest absorbing power but contains comparatively little plant food. Straws, salt marsh hay, and peanut shells contain an appreciable amount of plant food constituents. Table 4 gives the percentage of nitrogen, phosphoric acid, and potash contained in some of the materials commonly used for bedding.

Table 4 — Percentage of nitrogen, phosphoric acid, and potash contained in bedding materials

	Pounds per hundred		
	N	P_2O_5	K_2O
Wheat straw	.50	.15	.60
Oat straw	.62	.20	1.24
Rye straw	.46	.28	.79
Barley straw	.95	.19	2.03
Peanut shells	.80	.15	.50
Salt marsh hay ...	1.10	.25	.75
Peat moss	.75	.05	.03

Spices Are Romantic

Condensed from Armour

COLUMBUS set sail to find a short route to "the spice islands" but discovered America instead. Spices have played an important part in the drama which constitutes the world's history. Always they have been highly prized because of their capacity to make foods more pleasing to the palate.

Spices are grown chiefly in the tropical regions of the Orient, and long before Columbus set sail one of the largest and most profitable businesses consisted of transporting spices from the East Indies via the long sea route around Africa or in caravans across Asia Minor.

There are a great many varieties of spices, chief among them being pepper, cloves, nutmeg, cinnamon, ginger, sage and mustard.

Pepper is the fruit of a perennial climbing shrub native to the forests of the Malabar Coast of India. It has been introduced successfully into many other countries, the most important of these being Java, Sumatra, Malay Archipelago and Cochin, China. For hundreds of years it has been the staple article of commerce between India and Europe.

Pepper climbs on tree trunks by roots in the same manner as ivy, and for this reason is known as the pepper vine. When cultivated, the vines are trained over poles or other supports like a grape vine. From two to three years after planting the first crop of berries appears, full bearing being attained at seven or eight years with the crop yield continuing for many years thereafter.

The pepper berries grow in clusters of 20 or 30 berries to the stem. Two crops a year are harvested, one in December and one in July. The berries are picked before they are fully ripe, as they are turning from reddish green to yellow. While spread out in the sun to dry they change color and shrivel, finally becoming the black, wrinkled, dry berry with which we are familiar. They are cleaned and ground to make our well-known black pepper.

White pepper is not a different species of the pepper family, but is the black pepper berries with the black hull or shell removed, leaving the white heart. This white heart is bleached even whiter by the sun, and is then ground into familiar white pepper.

The world consumes more pepper than any other spice, the percentage being about 55 for per-

Reprinted by permission from Armour, Chicago, Ill., June, 1940

per and 45 for all the rest of the list added together. Though pepper grew originally in India, production is now heaviest in Sumatra, Netherlands, East Indies, amounting to some 40,000 tons a year. The annual consumption of pepper in the United States is over seven ounces per adult capita, but it is even higher in other countries. It holds the distinction of being universally liked, and there isn't a country in the world but what receives its thousands of bags. History speaks of pepper as far back as 3,000 B.C., and it would certainly have fallen into disuse with advancing civilization had it not been such a valuable aid to digestion and possessed of the rare ability to complement the taste of almost any food.

Before leaving the subject of pepper it would be well to deal lightly with other so-called peppers. First is red pepper, which is the dried ripe fruit of any species of Capsicum, genus of the nightshade family. Cayenne pepper is also a preparation from the dried fruit of the species of Capsicum. Paprika is a red pepper made from a species of Capsicum grown in Hungary. None of these bears any relation to the pepper vine.

Mustard vies with pepper today in America as the most popular spice. Although it is small it is one of the most potent seeds of seasoning. Mustard was known to pre-historic man, is mentioned in the Bible, was used by Hippocrates in compounding his medicines, was believed by the Romans to be an antidote for scorpion bites, and because it stimulated the circulation of the blood, it gave rise to talk among the ancient Greeks about its powers to restore life to the dead.

The use of mustard as a condiment is as old as history, but in the 18th century an English woman discovered that mustard could be powdered to form a perfect paste condiment. The making of table mustard by grinding mustard seed with water must be done with the use of cold water as hot water destroys the essential oil.

Mustard probably originated in Asia, but the finest seeds now come from England, Holland, California, Montana and Kentucky. Some authorities consider the black mustard from California and Kentucky sweeter and better than any other mustard. Oil of mustard, from the seed of the black mustard plant, is combined with camphor in the making of castor oil, and recently research men discovered that mustard in the bath water relieves fatigue and nervous tension.

Cloves are among the major spices, were originally found in the Netherlands Indies, but now in Madagascar and Zanzibar. They are the nail-shaped flower

buds of the stately clove tree. Whole, they are used for studding baked hams and in pickling fruit. Ground,they are used in baking and cooking cakes and preserves. Oranges studded with cloves and suspended by a ribbon make delightful scent balls or pomanders to hang in rooms, or put in linen closets as moth repellents.

Cinnamon is the bark of the cinnamon tree that grows only one place in the world, Ceylon. Cassia, commonly called cinnamon because the flavors resemble each other, grows in several Oriental countries, and is therefore more abundant. Ground cinnamon today is used in baking and as topping for puddings and hot cereals.

Other popular spices are Allspice, the berries of a West Indian tree, resembling the flavor of cloves, cinnamon and nutmeg; ginger, root of a tuberous plant grown mainly in Jamaica and the Orient, used chiefly in cooking, but ginger ale requires a heavy annual tonnage; and nutmeg, the seed of the nutmeg fruit.

Ghost Meat

Condensed from Farm Journal and Farmer's Wife

Robert West Howard

AT Dodge City they still tell stories of ghost cattle that pound along the Chisholm Trail at midnight, guarded by cowboys dead these fifty years. But from Packers Row in Los Angeles to the slaughter houses in Boston they're beginning to tell stories of ghost beef, veal, lamb and pork.

This yarn isn't folklore. The meat is ghost meat only in the sense that the farmers who raised it don't get paid for it. The buyers get it through shortweight tricks in many of the 1,500 auction markets that have sprung up in the U. S. since 1932.

Cattle rushing and bawling across the scale platforms on a hot afternoon; cigar smoke and confusion; the scale beams and the weighmaster concealed behind dirty windows in a wood contraption that looks like an upright piano box. . . . Under these conditions it's fairly easy for the weighman to tip the scales four to thirty lbs. a head. That means better values for the buyers, and gives the auctioneer a margin for advertising higher prices than those offered by competitive yards or the union terminals.

It doesn't seem like much . . . a few pounds here and a few pounds there. But in one eastern state that has averaged eastern feeder stocks and only 25 auction yards, farmers are estimated to have lost $275,000 through short weights last year.

"The situation is so bad that we don't dare to finance auction marketing by the co-operatives," an official of the Farm Credit Administration told me last month. "They just can't keep up with the prices and hold the farmers if they attempt honest weights. But worst of all, the buyers won't come in."

Whose fault is it? Nobody's, it seems. The auctioneers point a thumb over their shoulders toward the buyers. The buyers blame it on the exacting reports demanded by their bosses. The packers shake their heads and say, probably truthfully, that they don't know anything about it and couldn't help it if they did.

Washington can do little because only a few of the auctions are large enough to come under the Packer & Stockyards Act. A few state governments have marketing regulations, but the laws

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controlling them are weak and full of loopholes. There have even been cases where state inspection seals, pasted on the scale's beam rider, have thrown the scales two and three per cent off balance, in the buyer's favor.

Consumer complaints against old fashioned, thumb-ridden scales in city grocery stores caused a cleanup there fifteen years ago. But that campaign never reached the stockyards.

Producers are apt to center their interest on livestock prices rather than weights. When auctions began to spring up in the late 1920s in answer to farm complaints against high yardage fees at the terminal yards, many auctioneers bought secondhand scales that had only 10 or 20 pound graduations. They further confused the issue by deducting from 3 to 5 per cent of the sales price for shrinkage during the truck trip from their farms to shipping yards.

The reason for this was that, from the beginning, the auctions were forced to compete with the prices fixed at the terminal markets. The easiest way around that problem was via the scales route. Auctioneers and buyers took to the idea with a rush.

"In running an auction barn successfully," a veteran auctioneer told me last month, "it is very necessary that you advertise the fact that you have plenty of 'hot buyers' at your sales. In my section of the mid-west there is an auction sale about every 20 miles, and there are only four competitive 'hot' buyers in the territory.

"On the very first day of my sale, the hog buyer of one of the big packing companies came around. He showed me the reports his company made him fill out to show the yard shrinkage on each hog he bought. He said that if my weights were right for him, he'd be one of my best buyers.

"I guess my weights never were right as far as he was concerned. For three years, he'd call me up after each sale and tell me that my weights were as much as six hundred pounds below the ones my competitors gave him. He said that their weights wouldn't show an ounce of shrinkage after he'd taken the hogs 40 miles by truck to his own yards."

Finally, this auctioneer sold his yards and went into the buying end himself.

In Texas, during the following years, he met auction men who had blacksmiths make the trigloops of their scales larger so that the buyer would obtain the break on every weight. . . . In Arkansas he was told by traders that some of that state's scale testers are "on our side of the fence." . . . At a union stockyard beyond the Mississippi, he watched a veteran

weighmaster rush cattle across his platform without attempting to balance the beam, and call out most of his totals by guess. "They all weigh about the same, anyway," he grumbled.

In Nebraska on a windy afternoon, he saw one set of scales give a variation of 30 lbs. in reweighing one hog. . . . Along the Pacific coast, he said, small buyers and packing plants make it a point to buy old scales that have 10 and 20 pound graduations. "They take all the advantage they can on the notches, then," he said, "and if possible will draw her back two or three points when weighing a run through fast."

Most "fast weighers" he believes are given instructions ahead of time. They have a favorite trick of stroking the beam each time they move the poise in order to bring the balance up.

Another weighman, last known to be operating in Montana, is reported to keep a small magnet concealed in a record book. The book is casually laid down under the shot-put at the end of his scale beam. The magnet holds the beam off from 10 to 30 pounds on each weighing.

A Nebraska weighman is accused of using a small vacuum cup to attach to the back of the beam rider and throw off weights. Chewing gum, with a small piece of lead in it, will do the trick, too, creating a drag of 3 lbs. on 100 lbs. or 30 lbs. on a 1,000 lb. weight.

There are plenty of suggestions, coming out of agricultural colleges and USDA offices. State laws controlling auctions, with all weighmen appointed, paid and supervised by the state, seems to be one way out. But when such a law was introduced in the Virginia assembly last session, some of the state's auctioneers received letters from a state-wide organization asking for donations of $50 apiece to fight the bill. The bill finally passed after a rider had been tacked on ruling that state weighmasters be used only after an order has been issued in each county by the board of supervisors.

Under such a plan, the auction yard pays the state and the state pays the weighmaster. But, as one official pointed out, "It's going to be awfully easy to persuade or blackmail that guy into playing ball with the people he works with every day."

H. H. Hulbert, of the Cooperative Research and Service Division of the FCA, recommends that the states place all forms of livestock marketing . . . auctions, direct buyers and terminals . . . on an equal basis, and that farmers in a united front then drive toward regulations to sell and quote livestock on nationally standardized grades.

Professor Robert C. Ashby, livestock specialist at the University of Illinois, contends that "strong, well-staffed central markets are essential under existing conditions, at least until some other system has proven its superiority."

Two methods of regulation might be taken at once:

(1) Appointment of watchmen by county Granges, Farm Bureaus and producer co-operatives to see that no monkey-shines go on in the weighmasters' coops.

(2) A loud, long squawk to the scale manufacturers to do the same thing for livestock producers that they did 20 years ago for city consumers . . . produce a tamperproof scale.

But while the experts suggest and farm organizations move slowly toward a study of the problem, the ghost meat still pushes across the scales; the weighmasters still turn screws that shouldn't be turned, deftly plug chewing gum and lead slugs where they shouldn't be plugged, and the farmer goes back home with a sales slip that is from 10 to 100 lbs. underweight.

Sulphur for Soils

Condensed from Texas Farming and Citriculture

EFFECTS of sulphur when applied to soils to correct excess alkalinity, to supply a fertilizing value and to curb the development of certain disease organisms, are the subject of a progress report recently made to the Texas Agricultural Experiment Station by Dr. G. H. Godfrey, plant pathologist at the Lower Rio Grande Valley substation, and Herbert Rich.

The principal conclusions are stated as follows:

"Sulphur has been put into practical use in the alkaline Rio Grande Valley soils. Applications of sulphur in spots or holes in soil around chlorotic citrus trees have repeatedly cured the chlorosis. Spot applications of sulphur-compost in holes 10 inches deep about the bases of chlorotic rose bushes have resulted in practically complete recovery in 30 to 40 days. Presumably a part of the root system has penetrated the acidified zones of soil and has there been able to absorb sufficient iron for the needs of the plant, whereas in the original alkaline soil the iron was in non-available form. The same treatment has been applied with excellent results to chlorotic gardenias, bougainvillea plants, and to petunias. Preliminary tests on the control of potato scab *(actinomyces scabies)* with "band" applications of sulphur-compost in the plant row have shown decided promise. In one test, 400 pounds per acre (200 pounds sulphur) so applied gave an increase of marketable potatoes over the check at the rate of 2100 pounds per acre, an increase of approximately 25 percent. Obviously in all these tests the objective has not been to acidify the entire volume of soil, which is impractical in soils containing large quantities of calcium carbonate.

These tests have demonstrated the possiblities of using sulphur composts as biologically active acid-producing mixtures, not only to develop quickly available acidity but also to continue to produce this acidity over a prolonged period, thus overcoming the effects of early neutralization or excessive leaching. One pound of sulphur can be oxidized to 3 pounds of sulphuric acid. The composts described and high-sulphur modifications thereof are indicated as having a place in agriculture where quick acidity and prolonged acid availability are desired, for some specific purpose, in limited soil zones."

Reprinted by permission from Texas Farming and Citriculture, July, 1940

Tanbark Etiquette

Condensed from Guernsey Breeders Journal

H. O. Henderson and G. Heebink

West Virginia Agricultural Experiment Station

SHOWING cattle is an educational process. It encourages the use of improved livestock. It demonstrates improved methods of feeding and management. It clarifies desirable type. It is a means of advertising and selling breeding stock. It is a medium for exchanging theories and practices among dairymen.

In the practice of preparing animals for the show ring, the methods of feeding and care are somewhat different from those followed in every day herd practice. Each exhibitor wants his animals to appear their best.

Feeding

Fitting to be well done, should start three or four months before the fair. It is not an easy task to obtain the proper condition and flesh in the case of calves. While they should carry sufficient condition to appear healthy and sleek and have bloom, they should by no means be too fat, because highly-fitted heifers may become shy breeders or low producers. Therefore, the ration should be one that stimulates growth rather than fattening. A good quality of roughage should always be fed. Various concentrate mixtures for fitting are in use. A mixture consisting of 100 pounds ground oats, 100 pounds ground corn or barley, 100 pounds wheat bran, and 100 pounds linseed meal has been used successfully. Another good mixture consists of 500 pounds wheat bran, 300 pounds ground oats, 100 pounds ground corn, and 100 pounds linseed meal. The condition of the calf should govern the amount to be fed. Because no rule will fit all animals, good judgment must be used in determining how much to feed. Decrease the amount of feed immediately if reduced appetite or digestive disturbance appears.

In the case of calves there is no great danger that they will be fitted to an excessively fat condition. Yearlings, and especially those carrying a calf, however, can easily be fed in a manner that will result in too much conditioning. If fattening is carried too far it results in thickness about the neck, coarseness at the withers, and roughness or patchiness over the rump. Furthermore, over-fit-

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ting is likely to take its toll in subsequent irregular breeding or sterility. Heifers that have a tendency to fatten easily should be fed grain in a cautious manner, and the mixtures should contain large portions of feeds such as wheat bran and ground oats and but little corn and similar feeds.

Managing

Best results will be obtained by keeping the cattle to be shown in the barn after fitting is begun. Another system that gives fair results is to keep them indoors during the day and on pasture at night. It is difficult to fit cattle well when they run on pasture at all times. Groom them every day with a brush of medium stiff bristles. This removes the dirt from the hair, causes the hair to be smooth and glossy, and softens the hide by bringing out the oil. After a thorough brushing, rub the hair with a soft cloth that has been dampened slightly in sweet oil, or give the calf a rub-down with the palms of the hands. This makes the hair sleek and softens and mellows the hide.

Most yearlings are pastured during the spring and summer preceding the fair, which is not so frequently the case with calves. The hide and coat of the heifer may need additional attention. To make the best showing possible, it is necessary to keep heifers indoors six to eight weeks before showing, at least during the day time. If given a cool, well-bedded stall, and if blanketed, they will show in much better condition than if left in the pasture. In either case, grain feeding plus linseed meal will improve their appearance considerably.

Leading

It is difficult to show a poorly-trained animal. A wild, unruly animal in the ring is a nuisance to all others showing in that class. Training to lead should start when the calf is a month or two old. The first step is to fit a halter on the calf and then tie her in a pen and let her pull. This should be continued until the calf has learned that the halter must be obeyed. She should be led each day and trained so that she responds quickly to a slight pull on the strap. If this training is postponed until the heifer is strong enough to break away from the leader, it will require far more training to bring her under control. She should be handled from the start so that she knows her owner is master. Train her to stand squarely on all four feet with head erect and topline straight. Showmen lead with the strap neatly coiled in the right hand. After the animal has been brought to a stop and posed, the strap is transferred to the left hand and the showman faces it standing slightly to the left and in front of the animal where he can watch its feet and topline.

Posing in this manner should be practiced every time the animal is led out for exercise.

If the heifer is well trained as a calf and if she has been led and handled regularly since that time, it should be fully as easy to show her as it was the previous year. If this is not the case she will be far more difficult to handle than she would as a calf, because she is larger and stronger. Heifers that are well along in their gestation period must be handled, loaded, and transported with care on the show circuit in order to avoid any accident which might result in injury.

Blanketing

Skilled showmen put blankets on their cattle several weeks before the first show. Blankets keep animals clean, protect them from flies, cause old hair to be shed, make the coat glossy and smooth, and sweat the hide; this makes it soft and loose. It is a good practice to remove the blanket each day while grooming the calf to give the hide and hair an airing. Satisfactory blankets may be made from heavy burlap sacks. Sew them together to fit the body of the calf and tie them on at the brisket, underneath the body behind the front legs, and high up around each hind leg. A purchased blanket or one made from canvas of light weight, may be kept in reserve for use at the shows, where it is desirable to have a clean, attractive blanket. When flies are bad it will help to keep blankets on if fly spray is applied to the legs and belly.

Clipping

It is best to care for the animal in a way that will require a minimum amount of clipping. With good feeding, regular grooming, and blanketing, it should be necessary to clip only her head and tail. Clip the tail from a point several inches above the switch to the tail setting. If the tail setting is high, the hair should be clipped off and the margin blended.

A good method of clipping the head is to start at the outside corner of the nostril and clip in a straight line to the lower corner of the eye. Do this on both sides. Then continue from the upper corner of the eye, under the base of the ear, behind the ear and the poll, directly across to the other ear. Repeat this on the other side and clip the space within this circle, namely, the face, forehead, poll, and ears. Clip the inside of the ears in all breeds except the Brown Swiss. In the case of a ewe neck, do not clip it. If the neck is level and covered with long hair it may improve the appearance to clip a narrow strip across the top of the neck and blend the margins carefully. Unless a smooth job of clipping is done throughout, the animal will

appear better unclipped than clipped.

Many heifers and cows show clearly defined milk veins. It may be desirable, therefore, to clip the belly of the heifer and cow in a manner that will reveal the veins, especially so if the coat is such that it obscures the milk veins completely. Furthermore, a shapely udder, with high rear attachment and carried well forward in the front, and with squarely placed teats, can be far more apparent and striking by clipping the udder, the inner thighs, and the escutcheon.

Polishing

The condition of the horns may add to or detract from the appearance of an animal. If the horns are badly out of shape or do not curve properly, horn trainers will correct this condition, but they should be used early and carefully. The shape of horns can also be improved somewhat with a jack knife and rasp. After the horns are shaped properly, polishing may be started a day or two before the fair. A rasp may be used first to remove the roughness. It should be applied to the horn in a direction away from the base and toward the tip. A rasp with an oval or rounded side is preferred. Then the horn should be scraped with a piece of freshly broken glass and rubbed with sandpaper or emery cloth. A smooth surface is required to take a good polish. One may apply a thick paste of pumicestone and sweet oil and rub it on the horn until it gets warm. Follow with a vigorous rubbing, or see-saw with a woolen rag. After a high state of polish is obtained, a small amount of brown shoe polish may be applied. Give the final polish with a clean woolen rag. Talcum powder may be used in place of shoe polish, but it will not keep the horn in a high state of polish for so long a period.

Trimming

Calves' feet as a rule do not need as much trimming as do those of older cattle. It is essential, however, that their toes be kept short so they will stand squarely on them instead of their heels. If trimming is required, throw the calf and use a pair of hoof pinchers for the job. Pinchers with one sharp edge and one blunt block are safest to use. With a farrier's knife, a slight groove should be cut down the middle of the sole of each toe from tip to heel. The sharp edge of the pinchers should be placed in the grooves with the block placed on the outside wall and the sole cut away to the proper thickness. The sole should be kept level. The side walls should be trimmed down and the toes should be kept of uniform length and fairly short. A rasp may be used to smooth up the job. Polishing may be done in the same

manner as in the case of the horns. When the calf is led out in the ring be sure that her feet are clean.

More attention to the feet and hoofs is required as cattle grow older. Toes may become excessively long and cause the heifer to assume an awkward action in walking, or an undesirable position when the animal is posed. The safest method is that of keeping them short by trimming them.

Washing

As in the case of clipping, washing may not be necessary if the calf has been cared for properly. If done too frequently the skin will lose its oil and become harsh and dry and the coat may lose its luster. One or two washings will be sufficient to remove dirt and stains that grooming has failed to remove. In washing, wet the animal thoroughly, use a pure soap, work up a good lather, rub vigorously with the hands or a soft brush, and when the dirt is loose, rinse out all the soap carefully. Soap left in the hair makes it rough and sticky. Remove the water with the edge of a short, thin stick, and dry with a large, clean cloth.

The switch should be thoroughly washed the day before showing. While still wet, it should be braided tightly into several small braids without allowing the hair to pull at the base of the tail. Tie each braid and wrap them all up in a rag to keep them clean over night. An hour before showing take off the rag, unbraid each braid, and comb and fluff out the switch. This practice results in a clean, large, fluffy switch of striking appearance.

Equipment

Some time before the calf is taken to the show, a list should be made of the equipment that will be needed while at the show. This list should include a water bucket, feed bucket, blanket, hand clippers, flash light, show halter, soap, comb and brush, bottle of sweet oil, sandpaper, emery paper, flannel cloth, and a pitchfork.

What the Development of the Refrigerator Car Has Meant to the Modern Farmer

O. O. Mills

General Superintendent, Fruit Growers Express Co., Western Fruit Express Co., Burlington Refrigerator Express Co.

SINCE long before the days of the modern air conditioned passenger cars, the railroads have been furnishing air conditioned cars for perishable freight. That is what refrigerator cars are.

Rarely does anyone stop to think what an important part the modern railroad refrigerator car plays in our present-day life. We have become accustomed to seeing hundreds of these cars speeding across the country in fast trains, but seldom give a passing thought to the far-flung benefits they impart to our national life. In the development of our country's modern and efficient rail transportation system, aside from the immense value to the stock raising, poultry and other allied industries, the evolution of the refrigerator car from its crude beginning to its present efficiency has been of inestimable value to the fruit and vegetable farming industry. When the net work of rail lines spread rapidly over the country, many new food producing areas were opened, which possessed decided advantages of climate and soil, but were at first too far distant from consuming centers for the growing and marketing of perishable products. Far sighted men engaged in the growing of fruits and vegetables realized the extensive benefits the farming industry would derive if some means could be provided by which these perishable commodities could be transported for periods of several days to a week or more and delivered on the consuming markets in good condition and with minimum deterioration. Much thought and care were directed to developing a railway freight car which, by refrigeration or other protective services, would provide this preservative service in transit and thus bring about the desired results. It was from such necessity that the refrigerator car was conceived and developed from its simple beginning to its present efficiency.

Prior to the time when there were means for protecting perishable products from deterioration in transit, the growing of fruits and vegetables was confined largely to the home garden and was incidental to general farming. Consumption had to be restricted to nearby markets which could be

reached within a short time by ordinary freight cars, boats, and wagons. After the refrigerator car was developed and became more efficient, it provided the means by which perishables could be protected from spoilage even for trans-continental distances, so that truck crops could be grown in areas much more distant from markets, and this gave the impetus to the production of perishable fruits and vegetables which has reached such large proportions at the present time and has resulted in one of the most important branches of our national farming industry.

Mention has been made of the value of refrigerator to the stock raising, poultry, and other allied industries. Our meat packing industry, in which they first came into general use, could not exist, as we know it today, without the refrigerator car, for fresh meats and packing house products could not be transported for wide distribution as they are now. The importance to the farmer of the refrigerator car for this industry is self-evident. Dairy and poultry products can, by the use of refrigerator cars, be shipped long distances from sections where the highest quality products can be produced most economically to the most favorable markets. This would be impossible without the refrigerator car.

Early experiments with the use of refrigeration in transit for delicate fruits were made with strawberries in refrigerated chests. While they did not prove entirely successful, they did form the nucleus of service now so widely rendered by the modern refrigerator car. The first refrigerator car had ice placed on elevated platforms and furnished exceedingly limited protective service. This was followed by a car having located, in corners, cylindrical tanks in which ice was used to cool the lading, but this design showed a tendency to freeze the commodity adjacent to the tanks without the desired protection throughout the load. As with the development of all instrumentalities which have come to be a requisite part of our every day life, new ideas and improvements followed the original beginning, and one of the most important in connection with the refrigerator car was experiments with the use of ice boxes in the ends having openings at the top and bottom so that cool air would circulate throughout the inside of the car and cool the entire load. Built around this principle, the modern refrigerator car renders the efficient service now available to those who desire proper protection for their perishable commodities while enroute from shipping points to markets.

As time has gone on, many improvements have been made to

bring the refrigerator car up to its present standard of efficiency. The size of the loading space has been balanced with the ice capacity of bunkers; effective insulation has been applied in the floors, roofs, sides, and ends, to accord with the needs of the traffic to be handled; slatted racks have been installed on floors so the lading is raised a few inches to improve circulation of air; the bunkers have been scientifically constructed to provide the most efficient means of circulating air through the ice out into and around the load; and many other improvements have been brought about, so that the refrigerator car which is now used daily and has become so commonplace in our national transportation scheme, functions efficiently, day in and day out.

Perhaps few of us stop to consider that the modern refrigerator car is used not only to supply refrigerator service for perishable commodities, but also, by using heaters in its bunkers, it furnishes heater service to protect shipments from freezing during the winter time when temperatures are low in some parts of our country. Furthermore, the car is designed so that it will render efficient protection without the use of either ice, or heat, but, by supplying ventilation for the load, to keep its temperatures within a satisfactory range. This is accomplished either by admitting the outsde air as the car travels across the country, or by closing its bunker openings and preventing the outside air from coming in contact with the lading when this air is either too cold or too warm to best preserve it. Thus the load is kept at desirable temperatures because of the car's insulation.

There has developed during recent years a new phase of very considerable importance to the farming industry and that is the sharp-freezing, or freezing at very low temperatures, of fruits and vegetables and other foods, which are kept in a solidly frozen condition until ultimate delivery to the consumer. The plants at which the fruits and vegetables are frozen are generally located in the producing areas, however, the frozen commodities must be transported, sometimes long distances, to the thickly populated industrial territories where there is the greatest demand. The modern refrigerator car has successfully taken its place in this new development and by the use of salt with ice to produce intensive refrigeration, makes possible the delivery of the commodities at destination at low temperatures in hard-frozen condition, thereby greatly enhancing this fast growing and profitable innovation.

The present modern and efficient in-transit protective service furnished by freight refrigerator

cars from all producing territories for perishables is not a haphazard operation. Highly specialized organizations continually devote their time and attention to the developments of improvements to make this service more efficient. The cars are built and kept in repair by men scientifically skilled in the art of refrigerator car construction. Highly specialized organizations are relentless in their inspections to be sure that all cars furnished for loading are proper and suitable in all respects; that they are clean and sanitary throughout and in the condition required for the loads they are to transport. Nor does the intense supervision stop here, for another highly specialized branch of the organization makes sure that the type of protective service ordered by the shipper is rendered throughout the movement of a load. For refrigerator service, there are icing stations properly spaced between shipping points and destinations, so the cars may be furnished ice at requisite intervals, and highly trained men carefully supervise the icing so that the required quantity is properly and efficiently placed in bunkers of the car at each point where it is iced. If the shipment is to be protected against cold, heaters are placed in the car and are regulated in accordance with the shipper's orders, and are as frequently inspected in transit as essential to be sure they are burning properly, and to supply fuel as needed. Should the shipment move without refrigeration or heat, but the bunkers must be opened or closed to admit or exclude air as varying outside temperatures indicate essential, this service is performed at frequent intervals in transit to provide the necessary regulation.

The use of the refrigerator car for supplying the essential type of protection in transit for perishable commodities has grown from its humble beginning until the present time, when there are about 144,000 cars, which transported nearly 2,000,000 carloads of foodstuffs last year, serving the needs of this perishable industry. All of the many advantages which the refrigerator car has brought to the farming industry cannot be enumerated in this brief article, but some are outstanding. There are in all sections of our country vast areas of farming lands utilized at the present time for the growing of well paying perishable products which, due to distances from large consuming markets, could not be so utilized were it not for the availability of the refrigerator car to provide the essential protective service, when moving the distances the products have to move to make their production profitable. This has not only resulted in developing a profitable branch

of the farming industry, but has increased the value of the land in the territories where it now can be used advantageously for producing perishables, rather than for general farming. Another important advantage to the farmer in the use of the refrigerator car is that it enables him to dispose of surplus crops and to better control market conditions. Because of the protective services rendered, cars may be held at points in transit, or at destinations, to best meet marketing conditions, or, while moving, the cars may be diverted from original destinations to other markets where better situations as to supply and demand, prices, etc., prevail. It also must be appreciated that the refrigerator car keeps the most delicate commodities fresh and clean and protects its lading from dirt, fumes, and other deleterious conditions which might contaminate the product. These and many other benefits have made the refrigerator car one of the most essential attributes of our modern rail transportation system.

The transportation of fruits and vegetables in railroad refrigerator cars is of the utmost assistance to orderly and profitable marketing. The railroads furnish the United States Department of Agriculture daily reports of the shipments of each of these commodities from all territories, the receipts at each large market, the number of carloads on hand there, and the number of carloads unloaded daily. Additionally, they report shipments passing principal points of reconsignment and diversion. All of this information, with market prices, is distributed daily by the United States Department of Agriculture to growers, shippers, receivers, and marketing agencies of all kinds which are interested. During recent years, the unknown quantities of perishable commodities transported by truck to the various markets, which cannot be held, but must be immediately sold there, have tended to disrupt the orderly marketing system developed with railroad refrigerator car transportation and this has reacted very greatly to the disadvantage of the growers and shippers.

The railroads have provided an adequate supply of efficient refrigerator cars to protect the peak demands for all perishable freight, and this dependable supply enables the farmer to know that when he produces fruits or vegetables or dairy or poultry products he can depend upon suitable transportation and the right kind of protective service from the railroads to whatever markets he desires to reach, and there is no other transportation agency available which gives him this assurance.

Aside from the outstanding benefits which the modern refrigerator car has brought to the farmer, the consumer must not be overlooked, for the car has made it possible for the consumer, regardless of how far distant from the fields and orchards, to enjoy throughout the entire year, every type and kind of perishable food, whether staple or most delicate.

Novel Poultry House

Condensed from Pacific Rural Press

D. M. Rutherford

MEMBERS of the Vantress family, mother and three sons, who operate a hatchery in Marysville, California, are building some very interesting new poultry houses. This equipment is different from anything we have seen in commercial use heretofore, and is an outgrowth of the combined experience of the Vantress family covering many years.

An important feature is the division of the flock into relatively small units measuring 8 by 13 feet and holding 30 birds. Leghorns in small units are less flighty. One house has been used during the past season. It is 400 feet long, 30 feet wide, and houses a Rhode Island Red flock of 3300 birds. Walls on both sides of the house are made of vertical lath, spaced 1½ inches apart. Ventilation is excellent—no chicken smell—yet there are no perceptible air currents in the house.

A 4-foot work alley extends throughout the length of the building. Floors drain to small gutters on either side of the work alley, with provision for drainage to the outside at intervals. Concrete floors are used; there are no yards. The even-span roof is made of corrugated galvanized iron with a cap ventilator running the entire length of the house. A sprinkling system is mounted on the peak of the roof for use during hot weather. This makes it possible to reduce the inside temperature several degrees.

Most unique is the arrangement of the perches and feed hoppers. Three small feeders, each about five feet long, are located one above the other but inclined upward and backward from the work alley somewhat after the

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manner of stair steps, with corresponding perches. These perches are used while the birds are feeding and are used also for roosting at night. Area under the perches is screened and can be cleaned from the work alley. The water troughs are made of galvanized sheet metal and can be cleaned from the work alley. They are equipped with ordinary faucets. The workman has instructions to clean and fill the troughs twice daily, and the trough will hold enough water for the intervening period between cleanings.

All work is done from the work alley except trapnesting and gathering eggs. Two rubber-tired wheel barrows are used rather than a rail carrier. They are less expensive and just about as handy.

In the large house containing the 3300 birds, one workman takes care of all the chores, including feeding and gathering of eggs, but does not clean the floors. Because of the type of construction, providing for excellent ventilation, there is less dampness than in the conventional house. Exceptional freedom from colds is reported thus far. An insulated egg room is used and eggs are gathered in wire pails.

In their poultry operations the Vantress brothers are endeavoring to place emphasis upon health. In the laying houses they provide a minimum of three square feet of floor space per bird. On the ranges they provide plenty of room and rotate the fields to be used each season.

Mass Breeding of Turkeys for Eggs and Meat

Condensed from The Poultry Item

TURKEY breeding has advanced to such an extent that today you can get just about anything you want. To satisfy the demand from small families, you can get a "stream lined" bird with small frame. Even more interesting is the work of a few breeders to combine standard body-type for meat, with high egg production. This is done by trapnesting, pedigreeing and progeny-testing.

How would you like turkey hens that lay from 80 to 110 eggs in five months, and hatch from 70 to 80% of all these eggs? Among these are two sisters which each hatched 47 husky poults out of 51 eggs in 79 consecutive days, and a family of six sisters which averaged 52 poults each, which was an average of 78.6% of all eggs set and an average of 90.2% of the fertile eggs. Or possibly you might choose hen No. 865, which has produced 101 poults up to the time pedigreeing was stopped in mid-July.

These are but a part of the records which the Bronze and Narragansett turkeys are making for Harold E. Shaw of Elbow Brook Farm in Massachusetts.

It began when Mr. Shaw, one of the largest commercial growers in Massachusetts, raising 9000 turkeys annually, started out to breed for himself a strain of combination egg-meat birds. They selected 30 of the best body-typed hens out of a flock of 2500 birds, and with these they put five outstanding meat-type toms, selected from five outside sources.

Since there were so few hens in that first year, the Shaws decided to pedigree and progeny-test all of these individuals. Only Bronze were kept the first year, Narragansetts being added the following year. These pedigreed and progeny-tested families have been continued to the extent that this year there will be four generations in some families laying at the same time. It is on these pedigreed and progeny-tested families that the Shaws rely for their flock improvement, since these birds have proven their ability to transmit to the succeeding generations their qualities of exceptional body type, egg production, hatchability, and livability.

Every Breeder Trapnested

In addition to their pedigreed stock, Elbow Brook Farm has a flock of approximately 1000 breeders, made up of 600 Bronze hens and 400 Narragansett hens. This phenomenal growth has been occasioned by the demand of neighboring turkey growers for

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Elbow Brook Farm poults. For the third consecutive season this farm was practically sold out on poults for the next season by the preceding Thanksgiving. Another interesting fact is that 75% of the poults this year will not go more than 40 miles from the farm and practically 50% will not go farther than 10 miles! Such is the growing demand for turks in the East.

Every breeder on Elbow Brook Farm is trapped. This is done for several reasons. Primarily, it gives the best check on the individual hen. It is from these records that pullets are selected to be kept over for another breeding season. Secondly, trapnests limit one bird to a nest, thus reducing breakage of eggs and also dirtying of eggs. In addition, because trapnests have to be tended regularly, it reduces sitting on the eggs, thus giving greater hatchability, and limits the natural inclination of the bird to set. Also, chronic setters can be recognized and eliminated.

Demand for Early Poults

As the turkey industry has grown and turkey growers are expanding their markets, the demand for early poults has developed. In the rigorous New England climate of Massachusetts, it is impossible to get turkey hens to lay early enough to meet this demand without housing the birds and providing them with artificial lights. For this purpose, the Shaw's have constructed two large breeder sheds, each 80 feet long by 30 feet deep, each shed to house 300 breeders. These breeder sheds are constructed of ordinary pine lumber, covered with tar paper for added warmth, and provided on the front with curtains for the windows when the weather is cold or windy. These sheds have only dirt floors and are provided with oat straw for litter. Each house is divided into two pens 40 feet by 30 feet, housing 150 birds, and each pen has an outside yard of approximately twice that size, into which the birds have free access, even on the coldest days.

By the use of artificial lights, it is possible to have the birds laying at any predetermined time. Setting pens are attached to the walls in each pen to facilitate breaking up the setters. A pen for the spare toms is provided on the end of one of the sheds, and the toms are alternated regularly at three-day intervals.

The Shaws like to have their breeders about 10 months of age before putting them into production. During this past year with the February-hatched stock, it was difficult to hold them back, since many of these birds started in to lay during July and August when they were only 5½ to 6 months of age. Most of this year's breeders were hatched last Feb-

ruary and March, 600 of them being housed the latter part of December. At this time the lights were used, and the day gradually lengthened until a 13-hour day was provided. This brought the birds into full production the latter part of January.

The remainder of the breeders are wintered in shelters in some protected spot and allowed to come into production during the normal season around the middle to the latter part of March. This coincides with the peak demand for poults around the latter part of April and the first of May.

By starting different broods, the same brooding equipment is used three times during the year. This allows an ample number of birds at the proper time from which to select pullet breeders, with market turkeys being available the year around.

The brooding equipment at Elbow Brook Farm is diverse but efficient for whatever the purpose. Originally hot water heat in long-type houses, holding 1000 poults, was in use. As the pedigree program was developed, this type of house was obviously inefficient for the small groups of poults resulting from the pedigreed pens, and 10 feet by 12 feet Massachusetts style colony houses with 10 feet by 16 feet screen porches were built. This meant a number of separated stoves, and so electric brooders were adopted for these houses.

With the advent of February and March poults, electric brooders were not adequate for uninsulated colony houses. These electric stoves were then used in the long-type houses with the hot water merely as supplementary heat for the first few weeks, and oil brooders were put into the colony houses during February, March and April. During May and June and for all warm weather brooding, electric brooders are used.

The type of brooder house now in favor seems to be a combination as a result of the years of experience. It is 16 feet by 20 feet divided into two pens 16 feet by 10 feet, each with a screen porch 10 feet by 20 feet. This type of house can be used to house pedigree breeders or for brooding in cold weather, because one oil and one electric stove can be used. Thus this type of house is in use practically the year around, and provides space for an efficient number of birds. whether breeders or poults.

During the regular brooding period of May and June, the poults normally stay in the brooder houses only 5 or 6 weeks, after which they are transferred to separate screen porches where they remain another 5 or 6 weeks before being put out onto the open range without shelter of any

kind. These porches are 20 feet deep by 80 feet long, divided into three pens, 20 feet by 20 feet, and holding approximately 250 birds each. The roosts are built at one end and have a roof over them; otherwise they are open.

Cattle Prefer Whole or Coarse-Cut Hay

Condensed from Successful Farming

A LOT of people have aired their opinions as to whether whole or chopped hay makes the better forage, but now cattle have had their say. University of Wisconsin investigators put it up to them by offering free choice of various types of hay.

The animals voted against fine-cut hay, chopped to quarter-inch and half-inch lengths. When it came to deciding between coarse-cut hay and whole hay, they weren't so sure, for two lots of cattle failed to agree on the question.

In the first trial, R. C. Fischer, F. W. Duffee, and G. Bohstedt used 8 mature Angus and Shorthorn cows. In partitioned mangers they placed separate 475-pound lots of timothy hay chopped to ¼ inch, ½ inch, 1 inch, 1.8 inches, and whole hay; then let the cows help themselves.

The 1.8-inch hay was most to the liking of these animals—it was eaten in 16½ days. By the time the whole 475-pound lot of this hay was gone, the cows also had eaten 306 pounds of whole hay, but had taken less than 100 pounds of each of the fine-cut hay.

In the second trial, John Zettel, Duffee, and Bohstedt used 8 Holstein dairy heifers and alfalfa hay, instead of beef cows and timothy. This time they carried out the experiment in a little different way, placing fresh hay daily in a manger divided into sections, and recording the amount consumed of each type of hay.

Under these conditions whole hay proved most attractive, for it made up 71.5 percent of all the hay consumed. The heifers tended to crowd around the section of the manger containing whole hay, and those which could not find room there generally ate whichever size of chopped hay was placed closest to the whole hay. For this reason the second trial did not furnish reliable evidence as to which hay was second choice.

This investigation, then, shows cattle prefer either whole or coarse-cut hay, but which is most palatable of all may possibly depend upon the type and age of the animals as well as the kind of hay.

—*Niemen Hoveland*

Sheep Production

Levi Jackson Horlacher

SHEEP have a permanent place in any sound system of agriculture production. They are the most adaptable feed consumers on the farm. As weed consumers and destroyers they are without an equal. Not only do they eat 90 per cent of all species of weeds which grow in the United States, but they chew the seeds and thereby destroy their power of growth. Many large farmers in the bluegrass region of Kentucky have found that the best way to keep weeds out of bluegrass pastures is to graze them with sheep. Sheep return large amounts of fertilizing constituents to the soil and distribute the manure evenly over the fields. The ability of sheep to maintain the fertility of the soil or to restore productivity to run-down soils has frequently caused them to be spoken of as the animal possessing the golden hoof.

Two Sources of Revenue

Sheep provide two sources of revenue annually. The most important is the market lamb. The percentage of lambs raised is an important factor in determining profit. Under average conditions a lamb may be marketed 9 months after the ewes have been bred. The second source of income is the fleece. In well-managed flocks the money received for the wool clip should pay the charges for maintaining the flock. Thus sheep fit well into the farming system because the main operations do not interfere with other farming operations and the only critical period comes at lambing time before the rush of spring seeding begins.

Systems of Production

In the United States there are four general systems of sheep production. The first, and the one which involves the largest number of producers, is the small or farm-flock system. The second, a speculative system, is the feeding system, in which sheep and lambs are fattened for market during the time of year when feed is plentiful. The third is the range system, involving the keeping of sheep in large flocks on the western ranges. The fourth is the purebred-flock system, the principal object of which is selling breeding stock.

Grades Versus Purebreds

The man with no experience in sheep raising should begin his operations with grade ewes. His object should be that of producing lambs for the market. The raising of purebreds is too diffi-

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cult and requires skill and experience which can be attained only after years of experience. After a man has learned how to produce wool and lambs for market successfully, then if he feels the urge, he can go into the business of raising purebred sheep.

Some Necessary Considerations

There are certain matters which should be given serious consideration by anyone who contemplates going into the sheep business. In the first place, he should have some training, which should best be a combination of education and practical experience. Many people imagine that sheep require no care and attention, that it is a lazy man's job, and that the chief task is watching the wool grow. Nothing could be farther from the truth. The time has passed when sheep should be looked upon merely as scavengers to clean up the weeds in the fence corners. A second consideration is that of capital. Capital will determine the amount and kind of land which can be had and thereby will influence the kind and number of sheep which can be produced. In most cases it is advisable to carry on general farming with sheep production as a secondary issue. In the range states, however, sheep raising is the principal line of business. Proximity to good markets is essential if marketing costs are to be reduced to a minimum.

Climatic conditions and the type of forage produced must be given consideration. Early spring lambs can best be produced where the winters are mild and the grass is luxuriant. Noxious and poisonous weeds, such as sometimes occur in the Appalachian Mountains, cause losses and should be avoided. Without proper fencing the sheep industry cannot thrive. Taxation and rates of interest have a direct bearing on profits. The value of land ultimately depends upon what it can produce and the net interest it will pay on the capital invested.

One of the biggest drawbacks to the sheep industry in the farm-flock states is the cur dog. Nothing is more discouraging to the sheepman than to awaken some morning and find that during the night dogs have killed half a dozen sheep and wounded 10 or 20 more. It is true that many states have dog laws, designed to protect the sheep owner and reimburse him for losses, but the enforcement of these laws rests entirely with the people of the state and of the county, and the result is that in most places the laws are not enforced.

Getting Into the Business

There are two ways of getting into the sheep business. The first and best way is to buy only a few ewes, perhaps 15 or 20, and

gradually grow into the business. A smaller number than this would not justify the expenditure necessary for the purchase of a good ram to head the flock. By growing into the business a man has a chance to learn while he goes along. He can profit by his mistakes and those mistakes will not prove so costly as they would with a larger number of sheep. There is much more chance for individual observation of the sheep, with the result that sick or ailing sheep can be singled out and given proper care.

Factors in Selection

One of the first things to consider in selecting breeding ewes for the farm flock is adaptability. It usually is a safe plan to purchase ewes from a poorer country than that of their new home. The ewes from the mountains of Kentucky have proved that they will do wonderfully well when placed on the rich bluegrass pastures of central Kentucky. On the other hand, ewes that have been brought from the Far West to the eastern states or that have been taken from the northern to the southern states have frequently failed to be profitable during the first year in their new environment, though after that they usually have done well. In looking back over the history of the English breeds, it can be seen that the English shepherds were seeking to produce sheep adapted to particular localities and did not go far afield to get any outside blood which was introduced.

A second factor is vigor. There is nothing more discouraging to the shepherd than to have a few sheep that are dull in appearance, appear to be weak, and are the laggards of the flock. Irrespective of age, such sheep should be eliminated. Sheep with plenty of vigor and vitality should be alert, active, bright eyed, strong in the back, and full through the heart.

In the third place, all sheep should be healthy and free from disease. Sheep that are purchased in the public stockyards must be dipped before being shipped out. Many of our states have regulations governing the dipping and inspection of sheep which are being shipped from one state to another. But these safe-guards are not sufficient. Internal parasites and contagious and infectious diseases must continually be guarded against. When the average sheepman first notices that his sheep are sick, they usually are too far gone to be saved. This is a case where prevention is more important than the cure. Sick sheep quickly cause a man to become discouraged with the business.

Fourth, the most desirable age for breeding ewes is 2 to 4 years. Ewes that have raised one crop of lambs usually take better care of their lambs than yearling ewes or

ewe lambs. As a general rule, under average conditions, it is not considered a good practice to breed ewe lambs because they may be stunted in their growth and there may be some losses at lambing time. Experiments conducted at Canadian Experiment Farms, however, show no harmful effects from breeding ewe lambs. In British Columbia five ewe lambs bred in the late fall produced an average of one lamb the first year and 1.4 lambs the second year, while a similar lot unbred the first year produced an average of 0.75 lamb the second year. The average weights of the two groups at the second year were 176 pounds for the ewes bred at an early age as compared with 201 pounds for the ewes bred later. The ewes bred as lambs averaged 0.48 pound less wool in the second year. In Quebec 12 ewe lambs produced 83.3 per cent living lambs the first year and 100 per cent the second year, as compared with 125 per cent for the single crop from ewes bred as yearlings. The early breeding had little effect upon the development of the ewes except that those lambing late in the season were usually thinner at the following breeding season.

Fifth, all ewes should have sound udders. Each individual should be examined carefully to determine whether or not she has two good serviceable teats and an udder that is soft and pliable. A hard udder may indicate a tendency to develop a caked udder just after lambing.

In the sixth place, all ewes should have plenty of capacity for the consumption of feed and the development of the unborn lamb. It is impossible for ewes to produce large quantities of milk unless they can consume plenty of feed for the production of milk and the maintenance of body requirements. Ewes that have been stunted in their growth may produce good lambs, but they are handicapped when competing with well-grown ewes which have plenty of capacity. It takes plenty of good milk to make a lamb grow rapidly.

A seventh factor is conformation. For the production of market lambs, it is usually desirable to have a flock of ewes with a tendency toward the mutton conformation. This, however, is not so important if rams of an approved mutton type are placed at the head of the flock.

Eighth, the ewes would be selected for weight of fleece and quality of fleece. In the farm flocks, spring lamb production is of primary importance; yet the sheepmen cannot afford to ignore the wool clip. Under average conditions the wool should pay for the keep of the flock during the year. It cannot do this unless the average weight is good and the

uniformity of quality is such that it will grade well on the market. The average wool clip for the entire United States averages slightly over 7 pounds per head.

Ninth, all ewes should have quiet, motherly dispositions. Ewes that refuse to own their lambs should be avoided, as they are a continual source of trouble. Ewes that are nervous and excitable may be the cause of serious loss at lambing time. On the other hand, ewes that are too phlegmatic frequently fail to give the necessary care and attention to their lambs.

A tenth factor to consider is that of uniformity. Ewes that are uniform in type and conformation will come more nearly producing a uniform bunch of lambs for the market than will ewes that vary in type. A uniform bunch of ewes is a source of pride to the owner and, as a result, he probably will devote more care and attention to them than he would to a bunch of nondescript ewes.

Lastly, the prospective sheep owner should make a study of sheep production in his community and should select sheep that will fit into the prevailing practices of his neighbors. In this way he can take advantage of the accumulated experience of a large number of men and can avoid mistakes which they have made. If all men in a community breed a certain kind of sheep, then they can cooperate actively in sheep and lamb improvement and probably can market their product to better advantage than if each man is producing a different kind of sheep. If it is the plan to produce for a special market, then the breeding flock should be selected accordingly.

Selecting the Ram

The selection of the ram to head the flock is a matter of great importance. First, he must be a purebred. The breed of which he is a representative is a matter of secondary consideration. There are good and bad specimens in every breed. A purebred ram will sire lambs with much more uniformity in type and conformation than will a grade or scrub ram. This is self-evident because of the fixation of his characteristics due to a long line of pure breeding in his ancestry without the introduction of any outside blood.

In the second place, he should be a ram of strong individuality and masculinity. This is more important than that he should be of any particular breed. Given two rams of the same line of breeding, the ram with the stronger individuality and the bolder head usually is the more certain breeder and usually impresses his characteristics more strongly upon his lambs than does the ram which lacks in boldness and strength, but the only way to determine

definitely the actual value of the ram is by a breeding trial.

Closely coupled with individuality is a third factor, that of constitution. During the course of the breeding season the ram is subjected to considerable strain upon his constitutional vigor, and unless he is abundantly endowed with natural strength, he may have trouble in getting through the breeding season and may eventually become impotent. A strong constitution is indicated by a wide, deep chest; strong back and loin; and strong, large muzzle and nostrils.

Fourth, the ram should be selected to correct the defects present in the ewes. If the ewes are inclined to be too much on the leggy order and rather rangy in their conformation, then a thick, blocky ram should be selected to correct these defects.

Fifth, the ram should be of desirable age. The ram most in demand for the production of market lambs is the yearling. The yearling has his entire period of usefulness before him and during his first year of service can usually breed as many ewes as a 2-year old. From a commercial standpoint the ram generally is considered useful until he is 4 or 5. In particular cases, however, when a ram has proved to be especially valuable, he may be retained in the flock even longer.

Sixth, the ram must be sound. He should be examined carefully to see if both testicles are fully developed. Frequently one testicle fails to descend into the scrotum and usually this testicle is not developed. Such a ram may be a breeder, but it is not advisable to take a chance. If there is any evidence that at any time he has been affected by water trouble or gravel, he should be given no further consideration. He should also be sound in his mouth.

Seventh, it is of particular importance that the ram be strong on his feet and legs. Not only may these defects be transmitted to the offspring, but also a ram that is weak in these parts may have trouble in serving the ewes.

Eighth, the ram should have a good fleece. A tight, dense, uniform fleece in the ram is transmitted to the lambs and not only increases the value, of the fleeces but also gives them an appearance of uniformity. A compact fleece will be a protection against the elements.

Ninth, it is not of prime importance that a ram to be used in the production of market lambs should have all the breed characteristics demanded in a ram to be used at the head of a purebred flock. Frequently it is possible to purchase at a relatively low figure a ram possessing all of the characteristics desired in a good ram but with some relatively

minor defect in type which would make him undesirable in the purebred flock. In the commercial flock this makes no difference, because it is not the primary idea to produce sheep all of which adhere to certain characteristics of type.

The above is an excerpt from Sheep Production by Levi Jackson Horlacher, B.S.A., M.S., which we recommend as an excellent book on Sheep Production. It is published by McGraw-Hill Book Company, Inc. and for the convenience of our readers it may be purchased through the Farmers Digest. ($4.00)

Turpentine — An Old Southern Industry

Condensed from The Agricultural Situation

Alan Macdonald
U. S. Forest Service

GUM spirits turpentine from April 1 to 9, 1920, sold on the Savannah, Ga., market —major trading center for the naval stores industry—at $2.33 a gallon, or $116.50 a 50-gallon cask—an all-time high. During the corresponding 9 days of this year 1940, the same commodity brought 29½ to 30¼ cents a gallon, or on the average $14.94 a cask—less than 10 points above the record low of 19¾ cents a gallon in September, 1938. This decline, which represents a general drop in the price level of the principal products of the oldest industry in the United States, had of course its daily and seasonal fluctuations, but over all it was steadily downward.

This price decline was not accompanied by a greater production and a wider distribution of product. Actual output has changed little in the last 20 years. The production of units—a unit is 1 barrel of turpentine and 3⅓ barrels of rosin—from April 1, 1920, to March 31, 1921, was 525,000 as compared with 534,000 for the same period in 1938-39. The main products are turpentine, pitch, tar, and rosin, but an increasing number of others have been developed, such as pine oils, synthetic camphor, solvents, and other chemicals.

Some practical students and active participants in the industry believe that better days may be ahead for naval stores. Until 6 or 7 years ago, the business of cutting, or wounding, longleaf and slash pine trees and collecting the sap—oleoresin—was in many respects unchanged since it was begun in the virgin pines of North Carolina in 1665. Today, production methods that are less wasteful are being used, Government conservation programs are in effect, and research deals with the development of new uses and new products.

The naval stores belt includes, roughly, the southern half of Georgia, northern Florida, a slice of southern Alabama, and the southern quarter of South Carolina, with scattering production in Louisiana, Mississippi, and Texas. The gum naval stores belt covers a gross land area of 75 million acres. In longleaf and slash pine woods suitable for turpentining

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there are about 28 million acres, of which 7 million acres are being rested or have been worked out, and 11 million are in timber too small for working or mature timber held in reserve. The gum naval stores industry is the greatest single user of land in the deep South.

In 1932-33, when production was 450,000 units—the smallest in 20 years—and net cash returned to producers at the stills was $13,792,000 compared with the high of $63,509,000 in 1920-21, there were about 1,000 producers who distilled their own and others' gum, and about 11,000 producers—or turpentine farmers—who simply produced and sold gum. There were in the woods perhaps 50,000 Negro workers who chipped the faces on the trees, fixed the gutters and cups into which the resin ran, gathered this with buckets, and dumped it into dip-barrels, which were trucked to the old-time pot stills. About 30 percent of the producers owned their lands while the rest operated under lease, usually made for four years at a fixed rental.

Banks refused to lend money in advance on naval stores crops, and the financing of the producer was in the hands of "factors" who for years dominated the industry. Cash or credit from the "factor" enabled the producer to lease land, buy supplies for his operation and his labor, which lived in his camps in the forest and received an average wage throughout the year of around $5 or $6 a week. Sometimes, to protect his investment, the "factor" had to take over. When he found a successful operator, he urged him to lease more land and provided the funds. The result was that as a rule the producer was in debt year after year. There are instances of record where three generations of producers in a single family were continuously in debt to the same "factor"—grandfather, father, and son.

Rosin became an important commercial product about 50 years ago. Prior to that time most of the rosin was dumped as waste, much as cottonseed used to be. The business wormed on, using old-type stills and old methods. Often the home-made containers in which the turpentine was shipped leaked en route. The home-made rosin barrels, seamed with clay, were broken and smashed in transit and in hot weather the rosin often melted and ran out through the staves. The consensus is that the piney woods workers didn't realize that the world beyond the woods had changed. They seem never to have given much thought to the outside buyer of their products.

Then, about 1920 cheap mineral spirits began to be substituted for turpentine in paint mix-

ing. Cooking resin from old pine stumps developed as a rival industry. Naval stores industries developed in foreign countries cut exports which had taken for some years about half the United States output. For a number of years, most of the producers lost money, production and marketing costs as a rule being more than the selling price per unit at the still.

Beginning with 1934, there were several new developments. Outside capital, believing the day of the old pot still was done, began putting up modern distilling plants with the idea of buying gum spirits from surrounding areas. Today, there are five such plants in Georgia and one in north Florida. These central distillation plants cost $30,000 to $150,000 apiece as compared with $2,000 to $5,000 for the old-type stills. Some have 20 thousand and 30 thousand barrel tank capacity for the storage of crude gum. They have modern equipment for purifying and standardizing the output, and can feed the product to market in an orderly manner hitherto impossible.

These plants continue to ship turpentine in well-made wooden barrels to some extent, but most of the product now moves in tank cars. Recently a large business has been developed for the retail trade by packing turpentine in tin cans holding from 1 pint to 5 gallons. Hot rosin is shipped in vacuum tank cars to big soap-making outfits. The old-style wooden barrels for rosin are rapidly being replaced by metal drums. Many of the large processing plants are packing rosin in heavy paper bags of 100 pound net weight.

Another development has been the naval stores conservation program administered by the United States Forest Service. In effect, the naval stores program pays bounties to producers who follow sound practices in turpentining their trees, prescribing no chipping of trees under 9 inches in diameter at breast height, not more than one "face" on trees under 14 inches, and the keeping of fire, which prevents reforestation by killing young trees, out of the woods.

According to the Forest Service, in 1934-35 about 30 percent of all faces were on trees under 9 inches in diameter, breast height, whereas today it is believed not more than 6 percent is on such trees.

In 1936 was organized a national association of turpentine farmers. Membership includes more than 90 percent of all the producers by volume of production. The association is sponsoring a national advertising campaign for turpentine. It has underwritten a research program to discover new products from oleo-

resin and for the better exploitation of old ones.

At present 90 percent of the total consumption of rosin is used for soap, paper sizing, and varnish. Principal consumers of turpentine are paint and varnish and shoe-polish and leather-dressing, makers. Currently the demand for naval stores is steady and prices are firm. The European war seems to be having little appreciable effect, though it has temporarily closed most of the markets of Europe to the American product.

Factors in Mixing Rations for Poultry

C. S. Platt

Associate Poultry Husbandman

FOR a satisfactory margin of profit in the production of eggs, the cost of the feed should be less than 60 per cent of all costs, exclusive of labor and interest on the investment. Practically, this means that whenever it takes more than 8 dozen eggs to buy 100 pounds of feed, the poultryman is in a critical financial situation; when it takes from 6 to 8 dozen eggs to buy 100 pounds of feed, he will make a very low return for the labor involved; and when less than 6 dozen eggs are needed to buy 100 pounds of feed, he has a chance for a reasonable return, providing he has a normal flock of birds that will lay at a rate of 50 per cent monthly, with a culling and mortality rate not in excess of 50 per cent annually.

Rate of egg production has a direct bearing upon the returns above feed costs. Flocks laying at 60 to 70 per cent are much more efficient in the use of feeds than flocks laying at a rate of 30 to 40 per cent. Over a period of a year a well-managed flock containing both pullets and hens can, however, be kept above a production level of 50 per cent each month. Under such conditions the poultryman, to be successful, should be able to buy 100 pounds of feed with 6 dozen eggs or less. If he cannot do this, some method must be found to improve the situation.

There are three possible means of overcoming the problem created by low egg prices and high feed prices. One is to try to increase the price received for the eggs. This is of primary importance, because a price rise of one cent a dozen will be equivalent to a reduction of $3.00 a ton in feed cost. A second possibility is to increase the rate of production of the flock. This can be done by removing the unprofitable birds or the use of better stock. The latter is a long-time method and not applicable to immediate use. Culling of unprofitable birds can be done at any time and should be a common practice. However, when a flock is laying at a level of 50 per cent or better the situation will not be improved by culling, as under such conditions too many potentially good birds will be removed. A third procedure is to lower the cost of feed without interfering with the health and normal activities of the fowl.

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That is the factor here discussed.

Basic Requirements

The nutritive needs of birds of any age can be met by the use of yellow corn and oats, succulent green food, sunshine, oyster shell, and skim milk or buttermilk to drink. A poultryman who could provide these materials at low cost would be able to realize a profit even under conditions of low egg prices.

Actually, however, the feeding problem is more complicated, because many poultrymen are not in a position to take advantage of the simple requirements indicated as meeting the basic needs. Sunshine, a free product, so to speak, cannot be obtained by the commercial poultryman who has several thousand birds and must keep them confined to houses. Feed mixtures of proper balance must be made. Modern commercial feeds are built on the basis of supplying birds with all their requirements, so that they can be kept under the most adverse conditions from the viewpoint of natural food supplies, and still be maintained in normal health for growth or reproduction.

A basis for the construction of a mash suitable for birds of any age can be made by mixing equal parts of corn meal, wheat bran, wheat middlings, and ground oats. Such a basic mixture may be extremely variable in quality, as different samples of the various ingredients suggested are by no means uniform in analysis. For that reason, care must be taken at all times to see that the ingredients purchased come from reliable sources, and are in accord with the guarantee under which they are sold. Ingredients in the basic mash need not always be kept in the proportions suggested, although the wheat bran and wheat middlings should not be increased. These two products add bulk to a mash and have some nutritive value in their own right, but they are not liked by poultry. A mash containing a larger quantity would not be consumed as readily as one that might be mixed by lowering the quantity of the wheat products and increasing the corn meal.

The basis for grain feeding can be built around yellow corn, as it generally is the cheapest grain that can be fed. It should always be supplemented with at least one other grain and preferably two. Corn, wheat, and oats in the proportion of 40:40:20 by weight, make a good mixture for birds of any age, but such a proportion is not essential. As a matter of fact, no one grain appears to be absolutely needed by the birds, and the grains can be shifted around according to price. Barley also can be added to the list. Perhaps the best plan in developing an economical grain mixture, is to start with from 50 to 60 per cent

yellow corn, and then divide the rest of the mixture between the other grains, using at least two of them.

Supplements to Basic Feeds

Protein—The basic mixtures suggested for mash and grain will be deficient in protein for birds of all ages. This deficiency can be overcome by the addition to the mash of meat scrap, fish meal, soybean oil meal or corn gluten meal. Even cottonseed meal and peanut meal can be used under certain conditions. Milk products also furnish protein, but from the viewpoint of economy they should be considered in connection with providing vitamins, rather than proteins.

The question of whether to use meat scrap or fish meal is not of great importance. They are interchangeable in use on a protein content, although some fish meals do supply flavin and vitamin D in sufficient quantities to make them preferable to meat scrap for poultry use. Soybean oil meal should be used only when it can be purchased at a price comparable with meat scrap on the basis of the protein furnished. Soybean meal lacks some of the minerals found in meat scrap. Therefore, rations containing it must be supplemented with bone meal under most conditions. The same is true of corn gluten meal.

The total protein content of a mash does not need to vary with the age of the bird. Actually, a complete protein supplement could be made that would be entirely satisfactory for use from the day-old chick through the period of growth to final egg production and the breeding stage. The slight variations in protein content of the total ration that may be desirable at certain stages could be controlled by the quantity of grain fed.

Vitamins—As with protein, the basic feeds suggested also will be deficient in vitamins. Primarily, the only ones that will need to be seriously considered will be D and G (flavin). Vitamin D will be needed as a supplement only when birds are confined to houses. Under such conditions, it can be furnished by the addition of cod-liver oil or sardine oil to the ration, these ingredients being purchased on the basis of the number of vitamin D units furnished.

Flavin, as a supplement, will be needed whether the birds are confined or on range, except during a period of the year when succulent green food is abundant and birds have a chance to eat all they desire. Under the best conditions in New Jersey, this will be for only a short period. When green food is not available, alfalfa leaf meal or dehydrated alfalfa meal can be used to furnish a part of the flavin needed. (The dried alfalfa also is of value for its protein and

mineral content). Flavin is needed more during the early life of the bird, up to 12 weeks of age, and during the breeding season than it is during the period of later growth and egg production. It should be purchased on the basis of units furnished as suggested for vitamin D. At present such products as dried whey and the by-products of breweries give promise of furnishing flavin more cheaply than formerly, when it came from the dried skim milk or dried buttermilk used in the diet.

Minerals—The minerals needed as a supplement to the basic feeds are supplied in the meat, fish, or milk products used, with the exception of calcium, and possibly manganese. Calcium may be added to the mash in the form of limestone flour or oyster shell meal or supplied as a supplement in the form of limestone grit or oyster shell. It will be needed by stock of all ages, laying birds requiring more than chicks or growing stock. A possible manganese deficiency can be overcome by the addition of 4 ounces of manganese sulfate to a ton of mash for birds of all ages. If the mash should contain a sufficient amount prior to the addition of the supplement, no harm will result, as a surplus to the extent indicated will not be injurious.

The nutrient requirements of poultry are exacting, and rations should be made only from ingredients of known quality, but the fundamental needs of the birds can be easily met with relatively simple rations. In the long run, economy of feeding should be measured by the results obtained from a bag of feed, and not by its price. When home-mixed rations are used, the feeder should acquaint himself with what the birds need and when they need it. He should also know where he can obtain reliable ingredients. With this knowledge, he can develop rations that will be economical.

The Care and Preliminary Handling of Young Horses

Condensed from The Horse

Major Henry Leonard

MUCH has been written on the subject of how to develop a green horse; little is said as to the method to be pursued in getting him so far advanced as the "green" stage in such a condition of body, mind, and temper, as to constitute him a promising prospect for further development.

The breaking of a horse should be begun the year before he is foaled, by selecting a mare free from transmissible unsoundness, of excellent type, kind disposition, and level head, and breeding her to a stallion similarly favored by nature. It would appear that too much emphasis cannot be placed upon the desirability of a good disposition in both sire and dam. Though the rule is not without exceptions, an evil temper possessed by either parent is almost uniformly transmitted to the foal. Of course, the desirability of breeding from sound forebears would seem to require no further argument than the statement of the proposition, for though acquired characteristics are not transmitted, and perhaps most unsoundnesses become manifest subsequently to birth, yet they divide themselves into two general classes, viz.: those which result from injury or abuse, and those evidencing structural weakness. It matters little that a foal made his advent into the world without unsoundness if he has so great a predisposing vulnerability thereto at any given point as will necessarily entail a breakdown at that point when subjected to stress.

When the foal is about a month old a halter having a strap about six inches long pendant from the ring under the chin, is put on him, and this strap, by reason of its accessibility, is an invaluable aid in teaching the youngster to lead, for it offers opportunity whenever one goes into the paddock to take the foal by the head. Indeed, they almost teach each other to lead by tugging at these straps with their teeth while at play.

About this time the foal begins to nibble at the grain which goes into the dam's feedbox, so it becomes desirable to attach in one

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corner of the stall, a couple feet from the ground, a small box, having two smooth slats fixed diametrically across its top, thus making openings sufficiently large for the insertion of the foal's muzzle, but too small to enable the dam to reach the grain in the bottom. Into this box a couple handfuls of bran, ground oats, and a little linseed oil meal, mixed, are placed. This amount should be increased from time to time until the foal is consuming, per day, about one pound of the above mixture for each one hundred pounds of his own weight; that is to say, a foal weighing 400 pounds would receive four pounds of grain per day, divided into three feeds. In many, if not most of our states, except those actually on the seaboard, animals suffer from a decided iodine lack. I have found it most advantageous to health, growth, and in broodmares, to normal foaling, to administer, once each week, a solution made by dissolving 4 ounces of Potassium Iodine in one quart of distilled water. Two teaspoonfuls given in the evening feed of grain for two-year-olds and older, and one teaspoonful for yearlings and weanlings, will supply the necessary iodine, though, in addition, I use iodized salt as well, in the stable.

When he shall have attained the advanced age of about three months it is well to snap a lead rope into his halter-ring and teach him to lead. This can be judiciously accomplished by having one person handle the rope while another follows with a broad strap, or lath, now and again giving the foal a tap on the quarters when he stops or pulls back.

One cannot begin too young to pick up their feet and handle different parts of their bodies; this not only promotes tractability but is essential in order that feet may be leveled and young legs having pliable joints retain their proper and pristine straightness. Leveling feet should be done once each month, and if a given date is selected for this important task it will go far toward obviating its neglect through inadvertence.

With this régime foals will pass through the weaning period when they are about six months old, without any setback, inasmuch as they will be eating a regular ration of grain and will show no gauntness when deprived of the dam's milk. From this point until about two and one-half years are attained, it is good practice to turn them into a larger paddock, or pasture, whence they have access to a shed open to the south, or preferably to boxstalls opening similarly, keeping up religiously, however, the monthly attention to their feet and at the same time handling and brushing them as much as other activities will per-

mit. Good results will be derived from adding a powder composed of mineral salts and yeast to their daily feed; it appears to promote bone growth and it certainly stimulates appetite. Obviously, salt should at all times be accessible. As the youngsters grow and develop, the grain ration may be slightly increased over the formula of one pound to 100 pounds of live weight, according as the size, condition, and gain in weight of the colts may indicate the desirability of such action, always aiming to keep them in excellent flesh, but not bovine fat. The roughage used is timothy or meadow hay; alfalfa in lieu of other hay is fed three times per week; the latter produces excellent growth and supplies the necessary calcium in the ration. When available, there is no more desirable feed than oat hay cut rather green. In its use it is to be remembered that it may not be regarded as roughage, pure and simple, but contains concentrates in varying amounts according to its quality; therefore care must be taken to determine what quantity of grain, if any, is to be fed with it.

One of the most important factors in the development of young horses is the elimination of internal parasities, a field which has been but recently explored so far as equines are concerned, and with marked results. Breeders have in the past, and many of the less progressive still continue to have, the all too frequent experience of producing a foal, perfectly normal in every apparent respect, but which does not develop properly, is listless, and lacking in the energy and ambition which should characterize him; has a normal appetite but derives little benefit from his feed; is, in fact, a "runt" and to all appearances of constitutional inferiority. In many cases post-mortem examination has evidenced the presence of extensive parasitic infestation—worms of many species and in large numbers.

The carbon bisulphide and oil of chenopodium treatments, administered about a month apart, were evolved to eliminate this condition, and though of comparatively recent discovery, the results attained have been impressive. Commencing with the autumn after they are weaned, horses should annually be subjected to this dosage for internal parasites. Any breeder of fair experience has no difficulty in keeping his stock free from external parasites. With the application of this régime and the constant bearing in mind that the "eye of the master fatteneth the ox," the young horse should arrive at the autumn preceding his three-year-old form without untoward event.

It now becomes desirable to

handle the pupil a little more intimately and intensively. Accordingly, if not already there, he is installed in a loose box. The first step is to attach to the D's on each side of the halter noseband, a mouthing-bit with keys; I have an individual prejudice in favor of a circular, steel, key-bit with its own headstall, the top section of the circle, with attached keys, going into the mouth and the remaining arc passing under the chin. At the same time put on a leather surcingle, girthed loosely at first, and permit the young horse to carry these for an hour or so for each of four or five days, gradually drawing the surcingle tighter until it has the tension normally given a saddle-girth; after removing them and brushing him off, turn him out for the rest of the day. During the preceding two and one-half years the colt will have learned through constant handling, to accept the application of currycomb, brush, rubbing cloth, mane and tail comb, and hoof-pick. When the surcingle is taken as a matter of course, a backstrap and crupper are added. A small yard or corral, enclosed with boards, is the best place for these lessons, because such a tight fence precludes distraction of the attention of the pupil by what is occurring outside.

The next step is to tie to the backstrap and permit them to hang, three on each side, burlap sacks filled with straw; as the colt moves about, the sacks flap against his sides and legs and he speedily learns not only that no useful result is derivable from kicking at them, but that left alone, they entail no evil consequence. The mastery by a colt of this valuable piece of information avoids the probability of getting a blow from an iron-shod heel if a rider should come off. It is also helpful to hang a polo mallet from the roof in the center of the colt's box-stall, at such height that he will bump it with his neck, sides, and quarters as he moves about; this experience speedily teaches him to disregard a stick when swung by a rider on his back. No horse was ever rendered less desirable as hunter, charger, or hack because he had the preliminary training of a polo pony. By this time our youngster has played with the keys on his bit and has developed a good, live mouth; he accepts being girthed with the surcingle and carrying a crupper under his tail with unruffled calm. Incidentally, for this use the surcingle should be made of a good, heavy piece of harness leather about four inches wide, lined with rawhide and with adequate padding for the back, so that it sits well clear at the withers; the billets also should be lined with rawhide so that nothing will break at an unpropitious

time; two terrets which will drop flat, a leather billet and buckle to contain the check-rein, and two rings attached at about the location where shaft loops would come, complete an article which will remain secure despite the actions of an obstreperous colt, and can not hurt him, even though he go over on his back. A driving bridle, with blinders, a check-rein (worn very loose and used simply to prevent the youngster from boring), a leather-covered or hard-rubber bit, and a pair of rather light lines, round out your equipment.

The halter should be left on under the bridle and the man who is to go at the colt's head, snaps thereto a halter shank and leads out, with the second man handling the long lines well behind the colt. The lines are passed through the side rings of the surcingle and the colt travels between them as though in shafts. The driver, as the colt moves forward in response to the lead man's halter shank, calls "Right," "Left," "Whoa," or "Back" and uses his lines accordingly, but with a very light tension. The leading man compels the colt to execute the movement signalled, and also prevents the colt during the early stages from turning about and looking the driver in the face, after the provoking fashion of a tandem leader. After a couple of days of two lessons of one-half hour each per day, the leading man will no longer be required; the driver then omits to pass the left line through the side ring for a time, so that in case the colt should turn, the driver has but to drop the right line and hold the left in order to have a direct lead on the colt's head, all of which obviates the latter's winding himself up in the lines. In a few days (more or less according to the relative intelligence and aptitude of the individual youngster) he will turn right, left, stop, and back, according to the indication imparted through the lines. He is then said to "have a mouth."

The next step is to put a saddle (I prefer the Western stock variety at this stage) on his back, and after girthing or "cinching" him normally, to cause him to move about loose in the enclosed paddock until he becomes quite accustomed to the equipment and to the movement of stirrups, tiestraps, saddle blanket, and the saddle itself. Recourse is once more had to the straw-filled burlap sacks, and with one of these tied in the seat of the saddle and one to each stirrup leather, the colt is again put in motion. In a very short time he will pay no attention whatever to these additional burdens, even when the stirrups are lifted to a horizontal position at the sides and allowed to drop back into place. Having

arrived at this stage one will usually encounter no difficulty in getting into the saddle. This should, naturally, be done by degrees; that is to say, by putting the foot into the stirrup and slowly mounting until one can lean over the saddle while holding on to the pommel and cantle, followed by a little judicious patting of the colt on the neck. When this is accepted without cavil, the right leg can be slowly passed over, and the seat in the saddle assumed. It is well to work him under the saddle, in the enclosed paddock, for about ten minutes or so for each of a few days, after which all work should cease and the colt resume his pasture status until the following spring, when he will have attained to three-year-old estate. The total time covered by this work will not have occupied more than about two weeks; two half-hour training periods each day are to be preferred to one of an hour's duration, as young horses, in common with other young animals, learn better when not required to fix their attention for too long at any one time. As above indicated, work under the saddle with a light man on his back should not last for more than about ten minutes each day.

In the spring following, when the colt shall, in fact, have become a full three-year-old, he should start in with a rehearsal of what he learned in the previous autumn. Being satisfied that he has picked up the threads of his earlier instruction, and, as he is now about to be regularly ridden, it is well to assure one's self that he contracts no bad habits in the matter of head carriage; that is to say, that he flexes properly. The Wynyard Schooling bridle is an invaluable aid in this important instruction. Recurring once more to the use of leather surcingle, backstrap and crupper, the bearing-reins from the Wynyard bit are snapped into the terrets of the surcingle, sufficiently long to be quite slack, and the colt is started loose around the perimeter of the schooling yard, the instructor standing in the center with a long whip; by cracking the latter when necessary, the colt is kept in motion at a slow trot. When he starts to elevate his head and chin, the curb, actuated by the bearing reins, causes him to flex at the poll and draw his chin in, for he speedily learns that by so doing he escapes the action of the curb. The bearing-reins are shortened at intervals until the colt assumes the desired head carriage by flexing his neck. This instruction should continue for about fifteen minutes at first, but may be lengthened to a half hour after about three days. Naturally, having traveled in one direction for several minutes, he should be required to reverse and go the opposite way. He will shortly carry

his head with neck well flexed, so that bearing reins will be slack and exert no pressure upon bit or bars. Ordinarily, this work will not be required for more than a week or so in order to arrive at the desired result.

In view of the fact that he will now be doing regular work, he should be shod with a light set of flat plates. Some farriers imbued with the desire for self-expression and having unorthodox notions of orthopedic beauty, have a penchant for paring the frog, cutting away the bars, and reaming out the sole until it is as thin as paper and consequently can give no protection to the sensitive parts of the foot. None of these things should be permitted. Frog pressure is necessary to avoid contracted heels and preserve a healthy foot. The bars support the walls and have therein an important function to perform.

The colt may now be regarded as a green prospective polo pony, hunter or charger, as the case may be. While lacking knowledge of most of the things which a good riding horse, of whatever class, must know, he is mentally and temperamentally in a receptive frame of mind; having known man from earliest foalhood and been given no reason to suspect or distrust him, he does not regard mankind as an enemy, active and to be resisted. Virtually all of this preparatory work can be done when it will interfere the minimum with other farm activities unless there are a large number of young horses involved, which fact of itself presupposes a breeding establishment with an available staff in proportion to its size.

Putting Hay Crop Thru a Wringer

Condensed from The Ohio Farmer

C. F. Christian

PUTTING forage crops thru a "wringer" to speed curing, producing 400 pounds of beef from an acre of fertilized pasture and maintaining production of dairy cows at 50 pounds of fat per cow per month on grass and home-grown grains revealed to an overflow crowd the possibilities of grass farming in Ohio at the agricultural experiment station on June 6. The occasion was Pasture and Hay Day.

Lime first, fertilize second and apply manure where it will benefit new seedings were principles of soil management laid down by Earl Jones. Luxuriant stands of alfalfa, alfalfa mixtures, clover and timothy and pure timothy proved the soundness of the recommended soil treatments. Farmers repeatedly commented on the rank growth and freedom from weeds of the Wooster meadows.

Beef calves gained 400 pounds on the fertilized pastures in a season. Jersey cows averaging 50 pounds of fat per month receive in addition to grass all they will clean up of a mixture of 500 pounds corn, 300 pounds oats, 200 pounds bran, salt and steamed bone meal. No high protein supplement is needed on such pastures, C. F. Monroe observed. Bran and steamed bone meal provide abundant phosphorus.

Paddocks of four and eight acres are grazed in rotation by beef calves and dairy cows, testing production in terms of meat and milk. The stock is moved to fresh grass about every three weeks. Paddocks are clipped as vacated. White clover has nearly disappeared from the bluegrass paddocks this year, result of drought last fall. Clipping will give new white clover plants a chance to establish themselves.

The basic treatment on the pasture farm, according to D. R. Dodd, is repeated every four years and consists of 400 pounds of 0-14-6 the first year, cut into the sod with a disk drill between September 1 and April 1; topdressing of four to five tons of manure the third year; no treatments the second and fourth years.

Native Grasses Better Than Imported

Native grasses and legumes more than held their own in yield and resistance to insects, disease and weather hazards in comparison with imported seeds, L. E.

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio, June 15, 1940

Thatcher declared. One promising legume, kidney vetch from England, is deep rooted and produces a heavy tonnage of forage which is used abroad for sheep and hog pasture. Louisiana and Wisconsin white clover seed produce well at Wooster. Ladino white clover, a giant type 12 to 14 inches tall and grown in Oregon, is recommended where pastures are not drouthy. White and Ladino are sown at the rate of one pound each per acre in pasture mixtures.

"Wringing" the stems to hasten drying for hay is a correct principle, Prof. Willard said. The machine, seen for the first time at Wooster, trails the mower. Steel teeth pick up the swath just back of the cutter bar. The swath passes between two steel rollers turned by a gas engine. Springs bring 1000 pounds pressure on the forage passing between the rollers. The manufacturer cited tests at other experiment stations to prove that legume hays can be reduced to about 20 percent moisture content in half the time required to cure untreated hay.

Stems in a heavy clover-timothy mixture were soft and pliable after passing through the wringer; and there was appreciable increase in the rate of drying.

Selecting and breeding plots of timothy and of wheat were two stops on the tour. Thorne wheat, latest variety developed at Wooster, is outyielding all other wheats. Timothy plants varying in maturity as much as three weeks indicated that as much might be done to develop superior forage crops as has been done to improve the grain crops.

Evidence is accumulating that seeding wheat in standing corn with the one-horse drill and no seedbed preparation may produce satisfactory yields of wheat and do away with laborious methods of harvesting the stiff-stalked hybrid corns.

Is Creep Feeding Just a Fad?

Condensed from Hog Breeder

B. W. Fairbanks

IT has been the general impression among hog men for many years that a pig creep paid with weanling pigs. Few have disputed with the swine grower on this point, since it seems quite logical that feeding the pigs in a place by themselves was certainly much better than putting the young pigs against the sows in competition for feed at a self feeder or feed trough. Also it seems quite plausible that if the pigs were fed away from the sows, they would eat more feed, make better gains, and be in less danger of being trampled by the sows at the feed.

An experiment, however, conducted by the University of Illinois College of Agriculture and announced at the recent swine growers' day indicates that special feeding facilities for weanling pigs have but little advantage over the no-creep system of feeding. The results of the experiment also indicate that there is little difference in the two types of feeding when judged by rate of gain and economy of gain.

Two groups of sows were fed on rye pasture. Twelve sows with their litters totaling 96 pigs were put in one lot and fed ear corn twice a day on the ground. In a second lot the same number of sows with a total of 95 pigs were included, and ear corn again was fed on the ground, but a creep feeder was provided for the pigs. All of the sows used in the experiment were selected so that they would resemble each other as much as possible in age, number of pigs in the litter at 18 days of age, breed and weight of dam.

Both lots were seeded in rye pasture. In the first lot ear corn was full fed twice daily and a mineral mixture consisting of 2 parts ground limestone, 2 parts bone meal and 1 part of salt was available. The same feeds were given to the sows and litters in the second lot, but in addition to the ear corn and the mineral mixture, the pigs were given shelled corn and a protein supplement in a pig creep. The protein supplement for the pigs was made up of 2 parts tankage and 1 part soybean oilmeal.

The experiment began March 9 and closed May 26, when the average litter age was 56 days and the pigs were of weanling age. Few significant differences

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developed between the two lots. What differences did appear were very slight and tended to favor the no-creep method of feeding. Hence it can logically be deduced that there is little or no difference between the two types of feeding.

The two lots differed on the point of feed eaten for 100 pounds of gain. Surprisingly the sows and pigs on the no-creep lot where the pigs were subjected to competition with the dams consumed only 524 pounds of feed to make 100 pounds of gain, while the creep fed litters ate 533 pounds of feed for every 100 pounds they gained.

The rates of gains were also better in the no-creep lot though the differences were not great. The pigs in the no-creep lot averaged 21 pounds of gain, while the litters which had the advantage of the creep averaged only 20 pounds. Apparently the creep had little appreciable difference on the weight of the sows, proving that the pigs consumed the same amount of milk regardless of other feeding facilities. The sows whose pigs were creep fed averaged a loss of 43 pounds, while in the other lot the sows averaged a loss of only 41 pounds.

Competition at the feed trough with the dam did not seem to affect the number of pigs surviving the test. Ninety-three of the 95 pigs which started on the creep fed lot finished the experiment while 90 of the 96 pigs on the no-creep lot survived. This point may not be so important, since a number of factors may affect the death rate.

The results of this experiment are surprising, largely because the pigs that were creep-fed gained no more than those that had no feed in a creep. These observances concerning the pig creep are only preliminary, of course, and much more work will be required before definite values can be placed on the use of this device.

When Are Legumes Soil-Improving Crops?

Condensed from Better Crops With Plant Food

C. B. Williams

North Carolina State College of Agriculture, Raleigh, North Carolina

THE only class of crops that, when turned under, can gather and store in the soil any extra constituents needed in crop growth are the legumes, like soybeans, cowpeas, clovers, lespedeza, etc., when inoculated. The only constituent they can add to the soil when plowed in, other than what they took up from the soil, is nitrogen. These when cut and removed from the land will not ordinarily add any more nitrogen to the soil than they removed from it.

This being the case, legumes grown on land and removed for hay or any other purpose can hardly be classed as soil-improving crops, since under such a system of management, the nitrogen supply of the soil will just about be maintained and there will be a loss of from 8 to 16 pounds of phosphoric acid and 26 to 54 pounds of potash from the available supplies of the soil for each ton of legume hay removed. To replace these two constituents in the soil and make them the same as they were at the beginning of the year, it would require the addition to the soil of from 50 to 100 pounds of 16 per cent superphosphate and 52 to 108 pounds of 50 per cent muriate of potash for each ton of legume hay removed.

It may be surprising to some growers to know that, generally, legumes grown and removed from the land are much more exhaustive upon the available phosphoric acid and potash reserves of a soil per hundred pounds of crop removed than are most other crops grown and removed. For instance, 100 pounds of soybean seed removed from the soil carries 3.07 and 5.33 times more respectively of these constituents than is removed by 100 pounds of the kernels of corn plants. Cowpea seed take from the soil 1.05 and 3.43 times more on an average of phosphoric acid and potash respectively than do wheat seed. In the case of equal quantities of hays, soybeans removed from the soil 1.36 and 1.86 times more of these constituents respectively than does the hay of redtop, while lespedeza hay removes 1.34 and 1.18 times the amount of them

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respectively taken off in timothy hay. Soybean vines are 3.08 and 1.78 times as exhaustive respectively of the phosphoric acid and potash supplies of the soil when removed than is wheat straw, and 2.23 and 1.56 times more of a drain upon the supplies of these constituents on the available soil reserves respectively than is the removal of an equal quantity of oat straw.

From the above comparisons, it is readily seen that if legumes are grown on land and then systematically removed, they prove to be not soil-improving crops, but will be even more exhaustive of the available supplies of phosphoric acid and potash contained in the soil than almost any of the other crops commonly grown on the farms of the South.

In order that the growth of legumes shall be a help in building up the productiveness of any land, at least a goodly portion of them grown shall be turned back into the land either in their entirety or after picking or harvesting the seed. The crop then will prove beneficial, when properly inoculated, not by adding to the supplies of available phosphoric acid, potash, and lime of the soil which it cannot possibly do, but by adding organic matter, which many of our soils need, and by increasing the quantity of nitrogen stores of the soil.

Salt Marsh Hay

Condensed from Pennsylvania Farmer

Arlene Reasoner
New Jersey Department of Agriculture

WHILE their horse-drawn mowers mire in the swamplands, New Jersey farmers, like their grandfathers before them, mull over the newest rumors of industrial demands for their salt marsh hay. For almost inevitably, as harvests begin, some new experiment to skyrocket prices and multiply demand is reported.

Native to the coast lands of New Jersey this strange crop requires neither seeding nor cultivation, and can be harvested twice yearly at any time when the farmer desires—summer, winter, spring or fall; so long as the land isn't too far under water to permit a horse and cutting machine across it.

Grown without control or supervision, salt marsh hay firmly resists frost and shows no sign of winter kill. During a dry summer growth is profuse. And year after year, roots of the grass supply and hold humus, enriching that soil which otherwise would be barren sand.

Cutting begins as soon as hay attains a height of ten or twelve inches, and if harvesting is not completed by fall, farmers await a good freeze to make the ground solid, then continue cutting.

Estimates of salt marsh hay lands in New Jersey vary from 220,000 to 296,000 acres, with a wider range of guesses for the area harvested. Average yield is about one and one-half tons per acre. Prices range from $6 to $9, depending on the quality of the hay.

Much of the original land has been cut by mosquito drainage ditches. Salt marsh hay requires live rather than stagnant meadow; that is, a soil in which water circulates. Although such ditches in some instances have increased yields from the former one or one and one-half tons to three tons per acre, gatherers have fought such construction because of the added difficulties in cutting the grass.

Drainage Helps Control "Sleeping Sickness"

The New Jersey Department of Agriculture favors such drainage systems on the salt marsh hay lands because of the reduced mosquito population and the added health protection to horses.

Secretary of Agriculture W. H. Allen explains, "The salt marsh mosquito always has been under

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suspicion as a distributor of encephalomyelitis or 'sleeping sickness' in horses. Since meadows are intersected by the drainage system, farmers should consider that the somewhat greater difficulty of cutting is more than offset by the removal of such a health hazard and by the increased hay yield."

The hay is said to be of three types: long and short stemmed (scientifically termed "Spartina patens") and black grass ("Juncus gerardi"). The first type is best for packing and is used by manufacturers of silverware, glassware, clay and pottery articles as well as for coarser produce such as bananas. Short-stemmed hay is preferred for cattle feed and for mulching, road construction, etc. Black grass is an inbetween; neither salt hay nor upland hay and is an excellent cattle feed.

Because salt marsh hay harbors neither harmful weeds nor insects, it requires no inspection and is popular as a mulch in nurseries and for certain truck crops. Experiments in Cumberland county revealed that raspberry and strawberry beds protected by the shredded hay were 20 degrees cooler in summer and stood up until hard frosts in the fall, while uncovered plants in adjoining rows without the salt hay mulch showed parching and wilted early from cold.

Roads over marshy land are built up first with large stones, then small stones and gravel, then salt marsh hay and finally soil and concrete. Common hay is unsatisfactory because it decays too rapidly and is not quick enough drying for the use. Salt hay is known to delay deterioration for at least two years under soil and concrete.

In addition to its use in the basic structure, salt marsh hay is used to cover concrete on new roads to prevent too hasty drying of the concrete and permit its application in freezing weather.

Harry Reintinger, resident manager of the Burlington, N. J., branch of the United States Pipe and Foundry Co., describes another use for the hay.

"We need salt marsh hay in the manufacture of iron pipes," he said. "Direct from the meadows where it is cut it is brought to us by boat. About one ton of hay is needed for every 61 tons of pipe we produce."

Pipe making is done by two methods: centrifugal cast and pit cast, he continued. Both processes are followed in many foundries, but only the older pit cast method requires meadow grass.

According to Mr. Reintinger, two molds are prepared, between which the hot iron is poured. After the longest stemmed grass has been slightly dampened, and twisted into "rope" one-half to

three-fourths inch in diameter, it is ready for use on the inner mold or core. This consists of a steel spindle with holes through which gases escape. About the spindle, several thicknesses of salt hay rope are wound. Then this is packed over with mud. The entire core is inserted within the outer mold and the hot iron poured between. The heat from the iron, penetrating the mud, is so intense that it causes the hay to burn, thus making it possible to remove the steel spindle and dried mud. Without such protection, the spindle would expand until it could not be withdrawn.

Today most marsh hay is baled and shipped by truck. The bales run from 105 to 156 pounds in weight with an average of about 128 pounds.

Always holding the potentialities of a million-dollar industrial crop, salt marsh hay continues to bring only a little more than the cost of harvest.

Chemurgic Utilization of Meat By-Products

Condensed from The Cattleman

Ernest L. Little

Managing Director, National Farm Chemurgic Council, Columbus, Ohio

IN no other industry has the basic principle of farm chemurgy been so fully developed as in the packing industry. The utilization of non-edible products has long been outstanding and each year new industrial uses are reported, thus creating new additional markets for the cattle raiser.

By-products of the packing industry naturally fall into two general classifications, those used as food and those which are inedible. Of the former the more important articles are tongue, brains, meat portions of the head, liver, kidneys, tail, sweetbreads, tripe and intestines used for sausage casings. Intestines, however, are also used for inedible products, such as surgical ligatures and violin strings. The principal inedible by-products include hair, hides, glands, bones, hoofs, horns, sinews, fats and blood.

Meat packers quite generally realize that it is usually more profitable for them to utilize as much of their product as possible for edible purposes. Therefore only those by-products which, because of their nature or of health or sanitary restrictions cannot go into edible consumption are diverted into inedible channels under usual market conditions. While the value of by-products as compared with the total value is small, owing to the number of animals slaughtered the aggregate realization is large. In 1935, the total value of these inedible by-products amounted to over $1,979,000,000, representing only 7 per cent of the total value. This amount is increasing yearly as new values are being developed by the research laboratories. The important uses of these inedible by-products are as follows:

Glands, such as the thyroid, parathyroid, pituitary, pineal, thymus, adrenal, gonads (sex glands), and pancreas, from which are derived a variety of important pharmaceuticals, including insulin, pepsin, pancreatin, thyroid extract, adrenalin, and many others. The benefits bestowed upon the human race by scientific research with these glands are well known. Red bone marrow and liver extract have

Reprinted by permission from The Cattleman

meant possible cures for pernicious anemia. Due to the necessity of obtaining the glands quickly and in commercial quantities in order that their pharmaceutical properties may not deteriorate, only the larger meat packers are able to find a market for this class of product. Improvements in methods of preservation might make it possible for smaller packers to enter the field more extensively.

Bones, hoofs, and horns are used principally for making fertilizers, feeds, glue, gelatin, bone by-products such as combs and knife handles, bone black, oils, and soap greases. Gelatin, though well known in jellied meats, ice cream and other food products, is also used in photographic emulsions. Glue, made from either hides or bones has been given considerable scientific research. No longer is it universally used as a dry flaky material which must be dissolved in water and applied hot. Chemical plasticizers can convert it into a pliable rubber-like material, which may be used in the manufacture of printer rollers, molding compositions, and as a flexible binder in gaskets, cork products, ornamental boxes, books, etc.

Hair is used principally for upholstering in the furniture and automobile industries. Curled hair is permanently resilient and soft, non-heating and non-absorbent. Long hair, usually clipped from the tail is often sold for filler in mattresses.

Sinews are used in the preparation of a variety of products. They provide the source for the manufacture of strings for tennis rackets, violins, cellos, harps, guitars and scores of other musical instruments. Intestines are even used by gold beaters to aid in reducing the thickness of sheets of gold. Some of the finer grades of intestines have even been used as caps for perfumery bottles. Surgical ligatures also find their source from the by-products of this industry.

Fats are frequently considered the most important by-product. In all processes where animal matter is cooked with or without water there is the problem of the invariable separation and recovery of grease. Depending upon the method used for the liberation and recovery of the fatty material a large number of grades are obtained. These are classified as to color and acidity and are known as white, yellow or brown grease. Many of these by cooling and pressing yield liquid oils of which lard oil is an example. Whether the fat is a liquid oil, a pasty grease, or a hard tallow determines the number of uses to which it can be put. Lard oil has been used for illuminating purposes by lighthouses and in miners' lamps. It is also used in the

preparation of textile lubricants and for cooling metal during machinery operations. Neatsfoot oil, made from the shin bones, is of value in the preparation of fine leathers, in oiling watches, as a flux in soldering, and in the textile industries. Inedible tallows find a ready market in the soap and candle industry.

Blood, when dried, contains about 87 per cent protein and therefore provides an excellent concentrated stock food. It is also used to prevent dysentery in young calves by the addition of a small amount in the milk on which they are fed.

Blood albumen is useful in the print cloth industry in fixing certain colors. Tanners frequently find that albumen assists in the finishing of various kinds of leathers.

Hides and skins are among the highest price-per-pound raw materials that agriculture produces. For the best flayed and cured hides and skins of cattle and calves the tanner often pays as much as, or more, per pound than the butcher pays for the dressed carcasses of these animals.

It is generally considered that for cattle an average of about 7 per cent of the live weight and about 11 per cent of the value of the live animal is in the hide. Obviously, the raiser of livestock has, therefore, a substantial proportion of his produce and source of income in the form of hides and skins.

The importance of hides and skins is shown by the fact that annually in this country about 120 million of them, worth nearly 200 million dollars, are tanned into leather having a normal factory valuation of around 450 million dollars. This leather is converted into shoes, belting, harness, and other goods for which the people spend yearly close to two billion dollars. Toward meeting the requirements of the leather industry domestic agriculture supplies some 40 million hides and skins, worth well over 100 million dollars. It is necessary, however, to draw upon foreign countries for some 75 to 80 million hides and skins, worth about 75 million dollars. Theoretically, at least, there is still available to domestic livestock raisers a potential market of tremendous magnitude.

In this country animals are not raised solely for producing leather-making hides and skins. The livestock population is governed primarily by other demands, as for meat, milk and wool. By improving the quality of hides and skins and preparing them for market in the best possible state of preservation, the domestic livestock raiser may participate to a larger extent in supplying raw materials to the leather industry. Improvement in the inherent

properties of domestic hides and skins, as through breeding and special feeding, obviously would place these materials in a stronger competitive position. Elimination of the spoilage and waste of domestic hides and skins would mean more hide substance and better raw materials for sale and greatly increased returns. Estimates of the annual monetary loss due to spoilage and waste of hides and skins from improper handling, faulty take-off, and poor cure have ranged from 10 to 20 million dollars. This loss is additional to that from damages of *ante mortem* origin, resulting from the attack of insects or infestation by parasites, the reduction or elimination of which damages would also greatly increase the aggregate returns for hides and skins.

During the last year, industry spent over $215,000,000 for research. Part of this amount was provided and used by the packing industry to improve the present utilization and to discover new industrial uses for meat by-products. Present research includes the following activities:

1. Studies on development of new and extended uses for lard, hoofs and horns.

2. Utilization studies on bones for the production of bone black and bone china or high-quality porcelain.

3. Studies to develop new and enlarged uses for oleic acid, stearine and related products. Other work relates to grease compounding and to testing substitutes for glycerine in softening of fiber.

4. Gelatin is being studied with a view to its use in the manufacture of photographic film and paper, in adhesives, in sizing, and in combination with artificial silk for the production of a substitute for sheep gut in tennis rackets. Investigations are under way on the development of new glues and adhesives of special properties and for special applications, such as the binding agent in rubberized goods.

5. Studies on glands and organs for the production of pharmaceuticals. Efforts are being concentrated on active principles or hormones, irradiated and vitamin-rich concentrates, and enzyme preparations. Other work relates to the production of enzymatic leather bates from the entire pancreatic gland.

6. Investigations on blood with the object of converting it into an adhesive suitable for veneer and plywoods.

7. Studies on hair for the production of amino acids or related products for use in fine grain developers for miniature photography.

8. Investigations on tendons directed toward the development of a product resembling paper or

parchment for drum heads, violin strings, sutures, etc.

9. Studies on wastes, such as economical recovery of protein from packing-house waste water and the development of new fertilizer materials.

10. Studies on hides for the modification of processes to reduce the time of tanning heavy vegetable-tanned leathers to several weeks instead of many months.

11. New uses for leather, the disposal of tannery waste, possibility of better curing, pickling and storage of hides.

Measure and Market Timber for Profit

Condensed from Southern Agriculturist

J. E. Stanford

FARMERS who sell timber know less about its quality and worth, as a rule, than they do about any other farm product that they put on the market. Yet, there is no other farm crop where familiarity with proper methods of grading and marketing would reduce waste and increase profits as much as would be the case with timber.

Since timber has long afforded a considerable part of the net cash income from the farm, it is important that owners of woodlands inform themselves about the different kinds of timber products, the methods of estimating and measuring them, as well as their value, the current market prices, and methods of selling any surplus products not needed for their own use.

It is advisable, so far as possible, for the owner to cut or harvest his own timber crop, because along with the rough timber products he will sell his labor and that of his team or truck. The owner, if well informed on timber, should supervise the harvesting of the timber crop, even if he does not use his own teams or labor.

Regarding this important matter, M. H. Bruner, extension forester, Clemson (South Carolina), Agricultural College makes the following interesting statement: "Frequently a timber owner can afford to pay himself $25 a day, so to speak, for the time he spends in supervising the cutting of the timber. The simple ideas of protecting, improving, and cutting timber will pay good dividends to the owner.

"Recently, for example, a farmer in Richland County sold the pulpwood on his farm with no plans for cutting. He permitted the contractor to remove the timber down to four inches in diameter. Now the land is practically barren and will not pay its taxes for the next 15 to 20 years. In contrast, an adjoining farmer with timber of the same size and density marked the trees that he wanted cut for pulpwood and saved the desirable ones for growth into sawtimber, poles and piling. The growth of trees saved is bringing in an income of $2 per acre annually. On the one hand, we have land devoid of timber capital; on the other, we have a timber investment that is paying 10 per cent interest each year."

Timber is mainly harvested in

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the form of logs for lumber; bolts and billets for wood pulp, cooperage, excelsior, woodenware, handles, vehicle parts, and many other uses; poles and piling for use by telephone, telegraph and railroad companies, and in other construction work; crossties for railroad use; mine timbers used in many ways in the mining industry, and cordwood used for fuel and various other purposes.

Many wood-manufacturing industries obtain their raw material in the form of logs and bolts. Logs may be sold by sizes and grades or without classification by the lot. Selling "log run" is simple and direct but offers good opportunity for speculation, usually much to the advantage of the buyer whose knowledge of timber is better, by far, than that of the seller. The method is advisable only after the owner has made a careful estimate of the amount and quality of the standing timber. Selling by sizes and grades, when these are specified and defined in the contract, often results in larger money returns.

The farmer who owns timber should be just as familiar with the various units of measure used in the sale of timber as he is with the units of measurement of his field crops, such as bales or pounds of cotton, tons of hay or bushels of grain. He must have his knowledge in order to be able to get the worth of his timber by making an estimate of standing trees and measuring or scaling the timber after it is cut.

Every farmer who plans to sell timber would profit by first securing a copy of Farmers' Bulletin 1210, issued by the United States Department of Agriculture. This bulletin gives the following information about measuring or estimating timber:

"To enable one to estimate the number of board feet in logs of different sizes log rules are used. A log rule is a statement, either in the form of a printed table or marked upon a measuring stick, of the estimated number of board feet of lumber which can be sawed from logs of various lengths different log rules in use, and the values assigned to logs of the same size by different rules vary considerably.

"It is very important to consider what log rule is to be used, because much depends upon it in measuring and selling timber. There is a great difference in both the amount of timber and the resulting money return. The Doyle rule, in many sections the standard and in some states the legal rule, is unfair to the seller for measuring logs below 28 inches in diameter. In the early days of large, cheap timber it was fairly satisfactory, but for small-sized timber it gives such low values as to make it unsatisfactory. The Scribner rule is fairer than the

Doyle. Careful sawing, however, should result in 10 to 20 per cent more lumber from second-growth timber than is credited by the Scribner rule. Owners of small logs will benefit when the international rule or some equally close rule has come into general use. As a comparison, a log measuring 10 inches in diameter inside the bark at the small end and 16 feet in length would scale by the international rule 64 board feet, which is approximately the amount of lumber that could be sawed from it with a circular saw of ordinary thickness (one-fourth inch kerf). The same log scaled by the Doyle rule shows 36 board feet, or only a little over one-half the amount that can be actually sawed."

The following steps are suggested in acquiring a profit-making knowledge of the sale value of timber:

(1) Take advantage of the experience of neighbors who have recently sold timber or have otherwise informed themselves in regard to good markets and current prices.

(2) Apply to the state forester, the county agent, or any other available public official or personal agency for sources of information and advice regarding possible markets and timber prices.

(3) Employ the services of some reliable man who has made a special study of market prices of logs and lumber, unless you have had much experience along that line.

(4) Get into touch, through correspondence and advertising, with outside buyers and thus awaken competition among as many prospective purchasers as possible.

(5) Determine the value of the material by reference to current market prices and the total cost of putting it on the market.

(6) Secure bids whenever practicable both by the lump and by log-scale measure.

(7) Market the higher grades of timber instead of using them on the farm for purposes for which cheaper material will prove serviceable.

(8) Remember that standing timber does not deteriorate rapidly nor do the uses of wood change greatly within a few years. The owner, therefore, is not forced to place his product on the market regardless of market conditions.

(9) Use a written timber-sale agreement in selling farm timber, particularly where the cutting is done by the purchaser.

Of first and foremost importance in making the maximum of profit from timber is to protect it from fire, maintain the proper stand on the land and keep underbrush cleared out or reduced to a minimum. Tractor operated machinery is now available for

cutting underbrush, and it is being used economically and with effective results by many owners of timber. Tractors and other machinery can also be used effectively in fire prevention and fire fighting operations.

New Orchard Culture

Condensed from New England Homestead

J. K. Shaw

A NEW method of orchard soil management is now coming into use. We call it heavy mulching. It has been the usual practice in sod orchards to cut the grass and let it lie, either scattered over the whole surface or raked under the trees. But the amount of mulching material that can be grown in a mature orchard is utterly inadequate as a heavy mulch. Consequently, most of the mulching material must be grown outside the orchard. A heavy mulched orchard, such as here considered, may be defined as one in which sufficient hay, straw or similar material, is applied over practically all the space occupied by tree roots to suppress the growth of grass and weeds through the spring and early summer. There are certain advantages of this method of orchard soil management.

1. It prevents soil erosion. The rainfall penetrates the mulch and the soil beneath and there is no surface run-off.

2. It favors a sufficient and more constant supply of moisture for the trees. There is no grass nor weeds to rob the trees of water, no loss of rainfall from surface run-off and decreased loss by evaporation from the soil.

3. Soil aeration is favored. It has recently been brought to our attention that tree roots will not function properly if oxygen in the soil is deficient. With a loose open soil and no hard crust at any time, air exchange between the atmosphere and soil air spaces is favored.

4. It gives the tree an undisturbed root system. This is equally true of a sod orchard and there is no evidence that root injury from cultivation often damages the trees seriously, yet it seems reasonable to believe that any disturbance of the root system is more hurtful than beneficial to the trees.

5. It is well suited to steep or rough, stony land. Orchards on such locations are not easily

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maintained in sod, and cultivation is difficult or impossible.

6. The mulch forms a cushion on which apples may drop with a minimum of injury. Preharvest drop is often severe, especially with McIntosh.

7. Mulching builds up an abundant supply of humus in the soil. All investigators are agreed that organic matter is good stuff to have in an orchard soil. It helps in regulating the water supply, favors soil aeration and helps keep soil nutrients in a form available to the trees.

8. Mulch can be applied at almost any time of year when other work is not urgent. It may be better to apply it in the fall or early spring. This is because it will be more effective in suppressing the grass in the orchard through spring and early summer.

9. The mulch furnishes a sufficient and suitable supply of fertilizer nutrients. In our experiments we have found an abundant supply of nitrates in the soil under the mulch and also plenty of available potash, even to a depth of three or four feet. This suggests that the mulch was effective in keeping potash in an available form.

There are some disadvantages of the mulching system:

1. There may be greater danger from mice and fire. In our own orchards we have thus far had no fires and mouse injury has been no greater or less than in our orchards in sod. Mulch should be kept two or three feet from the trunk of large trees to lessen the danger of fire injury to the trunk, which would be very likely to kill the trees. Killing of low branches will not ruin the trees. A large mulched orchard should be divided into plots by plowed strips, which serve as fire lanes. A thorough mouse poisoning program is essential.

2. A heavier pre-season drop may be expected in a mulched orchard. Even so, we have picked more apples from mulched trees.

3. It is relatively expensive. Here is the greatest objection to the mulching system. We estimate that we used in our own experiments about a pound per square foot of air dry waste hay each year. This means over 20 tons per acre of the surface covered. It is not necessary to mulch the whole surface of the orchard, though in a mature orchard it is best to leave only a space four to six feet in diameter around the tree trunk. The area under the tips of the branches and even outside of this area may be the most important.

Probably 20 tons per acre per year is much more than is necessary. We have had some astonishing results after mulching McIntosh trees with only about 2 tons per acre for two years. A plot of 10 trees in an orchard of

7 plots, variously treated, increased production from lowest to highest in two years in spite of the fact that the trees were the smallest due to eighteen years of starvation treatment. It is believed that any amount brought into the orchard will be beneficial. We have not enough evidence to say what is the optimum amount.

The usual source of mulching material is waste hay, straw or similar material that has little or no value as animal feed. Many fruit growers are making use of all such material available at a reasonable cost. I have said that the fruit grower could afford to pay as high as ten dollars per ton for waste hay; straw would be worth a little less as it has less direct fertilizer value. Some think that this figure is high. It can be supported only by the assumption of the long time value of the mulch in conserving the soil. The mulching of orchards is emphatically a soil building and not a soil destroying practice.

The limiting factor in orchard mulching is the supply of material. To grow an adequate amount for a mature orchard would require an area about the size of the orchard itself. It would cost a good deal to maintain such an area in grass or some other suitable crop, harvest it and spread it in the orchard. Many orchard farms have low, moist areas well suited to growing mulching material but entirely unsuited for growing trees. There are many orchard farms where it seems that if the owner would cut down half his orchard and use the land for growing mulch to spread around the remaining trees, he would have a more profitable enterprise.

Ranching in the Gulf

Condensed from Farm and Ranch

Dee Woods

ON Padre Island, off the coast of Texas, is the most unique cattle ranch in the world. There are no fences except those enclosing a few pens. A rope is never used save on rare occasions. There is just one pasture. It is 117 miles long, and from 1,400 feet to four miles wide. Cattle sleep with one foot in the Gulf of Mexico and drink out of wells. The island has been sold more times than the Brooklyn bridge, and it is known as the ranch with mahogany cow pens and barrel stave houses.

The island is a slender bar of sand nestling affectionately up to the coast of Texas from Corpus Christi to the mouth of the Rio Grande. It bathes in a semi-tropical sun, is a ghost in the mists, or is swept by a mad hurricane.

This, of course, presents problems non-existent on other ranges; it also eliminates various phases of work necessary to ranches the world over.

Riding fence lines is simply not done because there are no fences. None are needed. No self-respecting cow would wander off into the Gulf of Mexico nor wade several miles to the mainland across the briny Laguna Madre. Too, any fence built on the island is apt to be covered in a few months with drifting sand; though, in a few days afterward, the wind may change direction and uncover the fence. Such is the way of the wind.

Sand dunes are cut off or built up by the breeze. Grass grows to top the sand or sand blows to top the grass—an everlasting struggle. However, vegetation improves from year to year. The thicker the grass the more sand will be held in check and the larger the range will be. Geologists say the island is young, between 10,000 and 12,000 years old.

In times past, hurricanes have swept across the island. Few ranch owners have to consider such storms. In 1919 many cattle were lost on Padre because herds drifted with the wind, huddled on the lagoon shore. Wind and wave cut down sand dunes, swept them into Laguna Madre. When the storm was done, several hundred cows were counted, sand-covered, only their horns visible above the drifted sand.

The first ranch on the island belonged to a Spanish priest,

Padre Nicolas Balli, for whom it was named. He received the land as a grant from the Spanish Crown, paying $40 a league—knocked down from the asking price of $50 because it was claimed there was no water on the island. This was a "shenanigan," as fresh water can be found almost any place merely by gouging out a few feet of sand.

This is the reason it is said that cattle drink out of wells. Rain water soaks into the sand, forces back salt water until there is, at present, an accumulated head of over 100 feet of sand impregnated. For the wells, a trench with a depth of 4 to 5 feet is scooped out. The sides of the trough are boarded up, making a box with no bottom. Into this, fresh water seeps. To drink, cattle must kneel. The late Patrick Francis Dunn claimed he had the most "religious" cattle in the world. He would then explain that they knelt, not to pray, but to drink.

Dunn started his island ranch in 1879 with a small acreage. Before he died two years ago he owned all of it except 6,000 acres belonging to the famous King Ranch and a few hundred acres at the lower end. Even though he sold his island acres, Dunn ran cattle there until his death. Since then his son, Burton Dunn, has taken charge.

April and October are round-up months. The same procedure is followed year after year. A group of riders with enough jerky (dried beef) in their saddle bags to last for days, ride down to the southernmost end of the island opposite Port Isabel. No ranch hand has ever been required to stay at the lower end, as it is too lonesome. Trips are usually made down there about every six weeks to look over the terrain and cows, and to clean out the wells from which the cows drink.

The drive starts at the southern point. A day or two before it arrives at the lower camp, Green Hill, several men stationed at the camp go to meet the herd. After branding is finished here, routine is repeated at the next camp.

There are four camps on the island. Houses are built of drift wood thrown upon the beach—pine from Louisiana forests, teak boards tossed overboard from rice boats, Spanish cedar from Mexico and South America. There is truth to the claim that ranch houses are of barrel staves and cow pens are of mahogany.

Cattle are well-content on their island range. Tough grasses have much substance and cows simply don't have to eat as much food here as on the mainland. As a rule a calf grazes fairly close to where it was born. A calf born near Green Hill probably is branded there. A cow from Green Hill is a stranger to a cow from

Black Hill. Often, in summer months, cattle actually sleep with one foot in the Gulf of Mexico; salt spray seems to drive away mosquitoes.

Pat Dunn considered roping cattle unnecessary. "You run a calf down," he said, "rope him, brand him and he'll be afraid of you as long as he lives. We drive 'em into a trap. Once you get a bunch of calves penned they can't run clear off the forks of hades before you catch them."

On Padre, cutting chutes practically eliminate roping. A small bunch of steers and heifers are driven into a V-shaped trap having a small pen at one end at one side of which is a chute leading into two other pens—one for steers, one for heifers. In this manner hundreds of cattle can be separated in a few hours without much riding, roping and other movie stunts.

When the calves are branded, they are not roped. They are mugged—that is, they are caught in the pen and thrown by hand. When an expert roper goes to work, it looks just like his hand on the side of the calf and it falls over.

For marketing, the herd must be forded five miles across the Laguna Madre with iron pipes used as stakes to mark a trail through the shallowest water.

Ranch supplies are taken over by boat, and as there are no roads on the island, they are trucked down sands of the gulf beach which is, near the water, so hard-packed that a horse walking on it will not make tracks.

This beach is well known to fishermen all over the world since Corpus Christi Pass has been filled by wind and tide and has joined Padre to Mustang Island. On the latter, at its northernmost tip, is located the town of Port Aransas which is ballyhooed as the "tarpon capitol of the world," and is trademarked as the place "where the fish bite every day."

But only Padre's beach is traveled. The remainder of the island is unknown to fishermen; in fact, there is so much contradictory information floating about South Texas about Padre, and there are so many treasure tales and legends connected with Padre, it is the best known "unknown" island in the seven seas.

New Cholera Vaccine

Condensed from The Michigan Farmer

FEW farmers of America who have helped supply the nation's breakfast table with bacon and ham, have escaped the fatal inroads of hog cholera, the disease which statistics indicate costs them $500,000 annually for every million hogs, or 50 cents a hog. With the introduction of a new tissue vaccine by Dr. William H. Boynton, D. V. M., division of veterinary science of the University of California there is every reason to believe that this picture will be dramatically changed.

The new vaccine, known as BTV (Boynton's tissue vaccine), contains no disease producing virus and does not require the costly serum dose used in the serum virus treatment. It eliminates the need for taking active virus into the field, and the possibility of carrying the disease to uninfected herds through vaccination.

The development of the vaccine has required years of experimentation, research, testing under laboratory conditions, and the actual vaccination of hogs in the field. More than 100,000 of the animals have been successfully treated, thereby eliminating chances of its failure when administered by qualified persons.

The administration of the vaccine requires an altogether different technique from the serum-virus method. It is necessary that the veterinary learn the new procedure. The vaccine is given to swine which do not have the disease. It must build up immunity in the animals and if given to those which already have the cholera, it will be to no advantage. In fact in herds where hog cholera is known or suspected to exist, it is recommended that anti-hog cholera serum be given, alone. If in 3 weeks after the serum has been injected, there is no evidence of cholera infection, the vaccine may be used.

At least 3 weeks must elapse before vaccinated animals are solidly immunized. Two injections of the BTV are given the first year of immunization from 14 to 60 days apart. After that the breeding stock should be given one injection, yearly. When it is believed necessary to vaccinate suckling pigs before weaning, 2 additional doses should be given after weaning, the first one in from 2 to 4 weeks.

BTV is usually injected in the armpits of small pigs, and intramuscularly in the region of the neck of the larger animals. In both instances the site of the in-

jection should be previously disinfected.

It is further recommended that pigs purchased from outside sources be held under observation separately from the herd from at least 2 weeks prior to their vaccination. This is to prevent vaccination of pigs which have already been exposed or infected; to prevent the contamination of clean premises by such pigs; and to safeguard pigs in the existing herd which are of pre-vaccination age. The vaccinated animals which have built-up immunity will naturally not take the disease.

Only qualified veterinarians are to give the injections as they are in a position from study and experience to diagnose the disease, to prevent complications, and to ascertain when it is time to vaccinate. In unskilled hands the vaccine could be administered in the wrong manner and at a period when it would not work on the animals. This restriction acts as a safeguard for the farmer.

It is recognized that hog cholera is one of the contributing factors which kills an estimated 50 per cent of the pigs born. The yearly cost of the disease in this country is said to be between $20,000,000 and $30,000,000. Dr. Boynton believes that when hogs are raised under more sanitary conditions than they are in many instances, and cholera is either reduced to a minimum or entirely eliminated, it will be possible to place the same number of hogs on the market with a smaller number of breeds. This would indicate larger profits to the farmer by a saving in feed and a reduction in the number of pigs born. The average raiser of hogs could either reduce his breeding herd, or sell more to the market.

It at the time of vaccination of a herd with BTV, there are present pigs of pre-vaccination age or sows heavy with young, it is not necessary to vaccinate them with the others. They may be inoculated at a later date. Unlike the serum-virus treatment, the use of this method does not require the vaccination of an entire herd at one time.

Another advantage of the vaccine is the ability of the vaccinated animals to continue with feeding during the immunization period. These hogs are usually ready for market 2 to 6 weeks earlier than those which go through the experience of a serum-virus immunization. Since pigs weigh from 2 to 3 pounds at birth, and in from 6 to 7 months weigh 200 pounds, the time element is of considerable importance in the matter of profits.

For the Farmer's Library

These books are recommended as outstanding in their field:

Beef Cattle—By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Son, Inc. $4.00.
(See Farmers Digest, November, 1939)

Beekeeping—By Everett Franklin Phillips, Professor of Apiculture, Cornell University. Published by the Macmillan Co. $4.00.
(See Farmers Digest, July, 1940)

Breeding Your Own, or Raising Colts for Pleasure and Profit — By Clarence E. Bosworth. The Derrydale Press ($10.00). A book suitable for the breeders of hunters' and saddle horses.

Conservation in the United States—By Gustafson, Ries, Guise and Hamilton. Comstock Pub. Co. $3.00.
(See Farmers Digest, July, 1940

Dairy Cattle and Milk Production—By Clarence H. Eckles, B.S.A., D.Sc., late Chief, Div. of Dairy Husbandry, Univ. of Minnesota. Macmillan Company. $3.60.
(See Farmers Digest, February, 1940)

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.
(See Farmers Digest, October, 1939)

Farm Meats—By M. D. Helser, B.S.A., M.S., Prof. Animal Husbandry, Iowa State College. Macmillan Co. $2.90.
(See Farmers Digest, January, 1940)

Livestock and Poultry Diseases—By W. A. Billings, Asst. Prof. of Vet. Medicine, Univ. of Minnesota. Macmillan Co. $3.50.
(See Farmers Digest, June, 1940)

Poultry Husbandry—By Morley A. Jull, Prof. of Poultry Husbandry, Univ. of Maryland. McGraw, Hill & Co. $4.00.
(See Farmers Digest, July, 1939)

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. Macmillan Co. $3.75.
(See Farmers Digest, September, 1939)

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Co. $4.00.
(See Farmers Digest, September, 1940)

Vegetable Crops—By Homer C. Thompson, Ph.D., Prof. Veg. Crops, Cornell Univ. Pub. McGraw Hill Book Co. $5.00.
(See Farmers Digest, May, 1940)

For the convenience of our readers, books listed may be purchased through this Department. Address C. Leavitt Dyer, Farmers Digest, Ambler, Pa.

Soil Conservation Bulletins

To Hold This Soil
Miscellaneous Publication No. 321, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 45c

Terracing for Soil and Water Conservation
Farmers' Bulletin No. 1789, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 10c

What is Soil Erosion?
Miscellaneous Publication No. 286, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 15c

Strip Cropping for Soil Conservation
Farmers' Bulletin No. 1776, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 5c

The Land in Flood Control
Miscellaneous Publication No. 331, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 10c

Conservation Farming Practices and Flood Control
Miscellaneous Publication No. 253, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 5c

Soil-depleting, Soil-conserving and Soil-building Crops
Leaflet No. 165, Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 5c

Soil Conservation Districts for Erosion Control
Miscellaneous Publication No. 293, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 10c

Soil Defense in the Northeast
Farmers' Bulletin No. 1810, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 15c

Erosion on Roads and Adjacent Lands
Leaflet No. 164, U. S. Department of Agriculture
For sale by the Supt. of Documents, Washington, D. C. Price 5c

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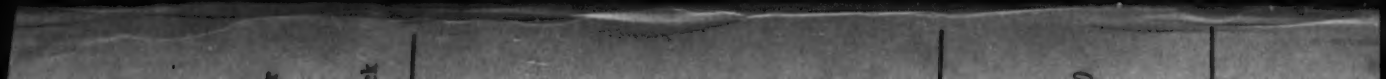
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